3.2 AIR QUALITY AND HUMAN HEALTH RISK ASSESSMENT

This section summarizes the methodology and results of the air quality impact analysis (AQIA) and human health risk assessment (HHRA) conducted for the proposed Long Beach Airport Terminal Area Improvement Project. It also presents information regarding existing conditions and trends as well as the current air quality regulatory setting, which influence activities in the region. The *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport*, which was prepared by Camp Dresser and McKee (CDM) in September 2005, is included in its entirety as Appendix C.

METHODOLOGY

Emissions Estimates

A detailed emission estimation methodology is included in the Protocol for Conducting the Air Quality Impact Analysis and Human Health Risk Assessment for Long Beach Airport, provided in Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C). A summary of the methodology is presented below, and deviations from the protocol are noted.

Criteria air pollutants associated with airport operation include: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). The analysis of O_3, a photochemical oxidant, was accomplished by estimating emissions of its precursors: volatile organic compounds (VOC) and oxides of nitrogen (NO_X).

Toxic Air Contaminants (TAC) emission inventories were developed for those pollutants known or expected to be emitted by sources at the Airport. Emissions from both aircraft and non-aircraft activities were estimated for the following alternatives:

- 2005 Existing Conditions
- 2011 and 2020 Project with Optimized Flight Operations
- 2011 and 2020 No Project with Optimized Flight Operations

Hydrocarbon (HC) and particulate matter (PM) emissions were developed for airport sources, with the latter including both metals and diesel exhaust PM (DPM). Specific TAC emission rates were then estimated through use of speciation profiles suitable for each source/pollutant. Pollutant-specific emission rates were estimated for the following types of sources operated at the Airport:

- Aircraft and auxiliary power units (APU).
- Ground support equipment (GSE).
- Ground access vehicles (passenger, employee, cargo).
- Fuel storage and handling.
- Maintenance facilities.
- Utility plants.
- Construction equipment and other construction activities that generate air emissions.

The primary emission models used to develop criteria air pollutant inventories for the Airport included the Federal Aviation Administration's (FAA's) Emissions and Dispersion Modeling System (EDMS), Version 4.3 (FAA 2005) for aircraft and APU sources; the California Air Resources Board's (CARB's) OFFROAD model (CARB 2001) for GSE, CARB's URBEMIS 2002 model (CARB 2003a) for construction equipment, and CARB's EMFAC2002 model (CARB

2002a) for on-road motor vehicles. The PM_{10} and $PM_{2.5}$ size fractions from airport sources were determined using the CARB-approved California Emission Inventory and Reporting System (CEIDARS) (CARB 2002b). These models were supplemented with AP-42 emission factors (U.S. Environmental Protection Agency 1995a) for fuel storage and handling, and South Coast Air Quality Management District (SCAQMD) California Environmental Quality Act (CEQA) guidance for project-related terminal heating, ventilation and air conditioning (HVAC) systems.

Aircraft Emissions Estimation

Aircraft emissions are primarily dependent on the following:

- Category of operation and number of operations for each category.
- Operational mode and time spent in each mode.
- Criteria pollutant emission factors for the type and size of engines used.
- Speciation profiles or other methods to determine TAC emissions.

These emissions are estimated from the mode-specific emission factors, the number of engines, the time in mode (TIM), the number of landing/takeoff operations (LTOs) for a given hour or year, and the temporal variations associated with each category of aircraft.

Fleet Mix and Operational Activity

Aircraft operations were determined for the following flight categories: (1) air carrier (2) air cargo, (3) industrial (aircraft manufacturing/maintenance), (4) commuter, (5) charter, (6) general aviation (GA), and (7) military/government. The temporal variations (activity variations by hour-of-day, day-of-week, and month-of-year) for these categories are presented in Attachment E of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Fleet mix and activity information for air carrier and commuter flight categories were obtained from 2004 Airport Noise and Operations Monitoring System (ANOMS) data (used to represent the 2005 Existing Conditions) and forecasts for the 2020 alternatives (HNTB 2004). The aircraft types for these categories are included in the ANOMS and forecast reports. The 2004 ANOMS data is summarized in Attachment C of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C), and the 2020 forecast report is presented in Attachment D to the same.

For air cargo, industrial, charter, general aviation, and military/government flight categories, the activity levels were assumed the same as the 2005 Existing Conditions. The Proposed Project does not expand facilities or components for these categories. The fleet mix for air cargo and industrial categories were based on the ANOMS data for 2004. The fleet mix for the other three categories was based on basic aircraft size (one or two engine) and type (jet/turbofan or propeller) provided by the City (City of Long Beach 2005a).

Time in Mode

Emissions occur during four basic modes of aircraft operation: (1) taxi/idle, (2) takeoff, (3) climb-out, and (4) approach. The time spent in each mode, affects the magnitude of pollutant emissions from that mode of operation.

A fifth mode, reverse thrust, has been included in some analyses. Reverse thrust results in similar emissions as climb-out or takeoff modes. For the purposes of this analysis, reverse thrust emissions were indirectly estimated by assuming that all aircraft departing from the Airport are fully loaded (depart at maximum takeoff weight) and thus spend more time in the takeoff and climb-out modes than aircraft departing at the airport-average takeoff weight. The calculation of the differences in takeoff and climb-out time between aircraft at maximum takeoff weight and those at 90 percent of maximum takeoff weight are included in the protocol presented in Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Data used to determine TIM were obtained from two sources. Taxi/idle times for the Airport were estimated at 10 minutes per LTO (EEA 1999). TIMs for the other three modes were the same as those calculated in EDMS - Version 4.3 (FAA 2005), for each airframe/engine combination analyzed.

Emission Factors

Mode-specific CO, VOC, NO_X, and SO_2 emission factors from EDMS 4.3 for both turbine and piston aircraft engines were used. Mode-specific PM_{10} emissions for aircraft turbofan engines are included in EDMS 4.3. However, a number of aircraft -- including all piston aircraft -- do not have PM_{10} emission factors in EDMS 4.3. Therefore, PM_{10} emissions were estimated using the emission indices presented in the protocol included as Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C). The aerodynamic diameter of PM from aircraft are typically much less than 2.5 micrometers (m) (Anderson, et al. 2003; Petzold et al. 2003), thus PM_{10} and $PM_{2.5}$ emissions from aircraft engines are assumed to be equal.

Chemical Speciation

To estimate chemical-specific emissions for aircraft in each of the flight categories, the following information was used: (1) HC and PM emission factors for each engine, (2) fleet mix and operational activity for each flight category, (3) TIM, and (4) chemical speciation for aircraft VOC and PM emissions.

The mode-specific speciation profiles for organic TACs used in this analysis are included in the protocol (Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport*), which is included in Appendix C. Piston aircraft VOC speciation was based on CARB's profile number 413 (CARB 2003d).

Metal speciation profiles are distinct for turbine and piston aircraft. For piston aircraft, lead is the only major metal pollutant, due to the use of leaded aviation gas. The lead specification for 100LL (0.56 g/gal) was used to estimate lead emissions from piston aircraft. For turbines, a profile was developed from elemental analysis of Jet A fuel conducted by the U.S. Navy (Shumway 2000). The elemental analysis is included in the protocol Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Auxiliary Power Unit Emissions

Criteria pollutant emissions from auxiliary power units (APUs) were estimated using EDMS APU assignments to aircraft types. Since the Airport does not use jet ramps (only external stairs), APUs were assumed to operate for 26 minutes per LTO (the EDMS default operating time for APUs). APU speciated TAC emissions were based on profiles used for aircraft engines, since APUs are small turbines fired on jet fuel.

Ground Service Equipment Emissions Estimation

GSE emissions of criteria pollutants were calculated using Airport-specific GSE population and fuel type, and CARB's OFFROAD model emissions, activity, load factor, and horsepower data (CARB 2005). It was originally intended to account for the effect of the South Coast GSE Memorandum of Understanding (MOU) in the GSE emissions inventory, per the protocol. However, the GSE emission inventories were ultimately developed without considering the GSE MOU due to concerns that the airlines may not implement the MOU in the originally agreed time period; which in turn was due to the airlines' concerns about pending emission regulations under consideration in California that would apply to GSE after the MOU sunset date.

The TAC inventories from GSE VOC emissions were developed from CARB Profile No. 413 for gasoline-fueled equipment and from Profile No. 719 for propane or natural gas-fueled equipment. The TAC inventories from GSE PM emissions were developed from CARB Profile No. 399 for gasoline-fueled equipment. DPM was assessed as a single TAC for the diesel-fueled equipment.

Ground Access Vehicle Emissions Estimation

Ground access vehicles include on-road vehicle activity associated with air passenger activity, air cargo activity, and general aviation activity. Gasoline and diesel passenger automobiles, various types of vans, buses, and trucks of different weight classes were included.

VOC from engine exhaust and fuel system evaporation, and PM from engine exhaust, tire wear, brake wear, and re-entrained road dust contribute to TAC emissions. Diesel exhaust PM was treated as a single TAC in accordance with current state guidance (Cal EPA 2002a,b).

The daily mass emissions for each criteria pollutant were estimated as the product of an emission factor and the amount of travel occurring on the Airport, expressed in vehicle miles traveled (VMT). The VMT itself is a product of the number of vehicles traveling on each airport roadway and the length of these routes.

CARB's EMFAC2002 model, Version 2.2 (CARB 2002), was originally intended to be used for developing emission factors for driving conditions typical around the airport. However, simplified emissions factors available from the SCAQMD, which are based on EMFAC2002 model results, were ultimately used. Speeds and VMT were estimated from data contained in the recently completed Douglas Park Final EIR (City of Long Beach 2004), supplemented with intersection traffic movements contained in the *Long Beach Airport Terminal Improvement Project Traffic Impact Assessmen*t (Appendix G of this DEIR). The fleet mix assumptions used in this analysis are presented in Attachment E of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C). Temperature and humidity parameters were selected to represent annual averages. Re-entrained road dust emission factors were estimated from a Midwest Research Institute report (MRI 1996) using county average precipitation and silt loading values.

Gasoline exhaust start, running, and evaporative hydrocarbons were estimated on a VOC basis and were further subdivided into specific TACs using CARB Profile No. 888 for engine exhaust in 2005, No. 894 for engine exhaust in 2020, and No. 906 for evaporative emissions in both years. Gasoline PM emissions will be fractionated according to CARB Profile No. 400. Evaporative emissions are assumed to be negligible for diesel vehicles. As previously mentioned, for the purposes of this analysis, diesel engine exhaust was treated as a single TAC, DPM.

Finally, elemental TAC emissions from paved road dust were developed using CARB Profile No. 471, from tire wear using Profile No. 472, and from brake wear using Profile No. 473.

Fuel Storage and Handling Emissions Estimation

Evaporative emissions from the storage and transfer of Jet A fuel, aviation and motor vehicle gasoline, and diesel were estimated based upon fuel use logs provided by the City for existing conditions. Future Jet A use was based on the aircraft activity and fleet mix in 2020 relative to the 2005 existing conditions. Aviation gasoline use was assumed to be constant from 2005 to 2020 since general aviation activity is not expected to change during that period.

Fugitive VOC emissions from the fuel facility storage tanks were calculated using the USEPA TANKS 4.09b (USEPA 1999, USEPA 2001) program. Fuel truck loading and aircraft fueling fugitive emissions were based on emission factors found in AP-42, Section 5.2 "Transportation and Marketing of Petroleum Liquids" (USEPA 1995a). The VOC emissions were speciated according to CARB Profile No. 100 for Jet A, Profile No. 906 for gasoline, and Profile No. 760 for diesel.

Utility Plant Emissions Estimates

Utility plant emissions were determined for those facilities that were impacted by the Proposed Project. Differences in emissions between 2005 and 2020 at these facilities were developed from changes in on-site structures (square feet of building floor space). Changes in the floor space resulted in changes in demand for electricity and building heating/air conditioning. Estimates of natural gas combustion emissions for heating and power were to be estimated from URBEMIS 2002 (CARB 2003) emissions data and supplemented if necessary by USEPA AP-42 factors (USEPA 1995) and/or SCAQMD annual emission inventory reports. However, the natural gas demand was eventually estimated using the SCAQMD CEQA Handbook and supplemental information contained on the website.

Due to the limited space for aircraft maintenance at the Airport, commercial aircraft maintenance operations are not extensive, and changes in maintenance activity were assumed to be negligible.

Construction Equipment Emissions Estimate

Criteria pollutant emissions from construction activities were estimated using CARB OFFROAD model emission factors (CARB 2001) for equipment engines, and URBEMIS2002 (SCAQMD 2005a) for architectural coatings and Parcel O grading/paving. Construction activities would include demolition of several existing structures, construction of new permanent terminal facilities and a parking structure, and addition of aircraft parking positions. Construction-related fugitive dust is assumed to be controlled by periodic watering (two to three times per day) as required by SCAQMD Rule 403; therefore, "unmitigated" fugitive dust emissions include a 50 percent control factor for this watering.

The Proposed Project would be constructed in phases as funding becomes available and as demand increases. The period of construction for a given phase is anticipated to be limited, typically between one and three years as shown in Table 3.2-1, below. Therefore, only TACs with acute Reference Exposure Levels (RELs), as defined by the California Office of Environmental Health Hazard Assessment (OEHHA), were analyzed for health risk.

TABLE 3.2-1
PROJECT PHASING

Element	Construction Start Date	Duration/Completion
Parcel O	Immediately following EIR certification (March/April 2006)	3 to 4 months
Parking Structure	3-4 months after EIR certified (June/July 2006)	18 months/Dec 2007
Terminal Improvements	1 year after EIR certified (March 2007)	24 months/March 2009
Source: City of Long Beach Public Works, 2005.		

The TAC inventories from construction equipment VOC emissions were developed from CARB Profile No. 413 for gasoline-fueled equipment and from Profile No. 818 for diesel-fueled equipment. The TAC inventories from construction equipment PM emissions were developed from CARB Profile No. 399 for gasoline-fueled equipment and from Profile No. 425 for diesel-fueled equipment. TACs from architectural coatings were estimated from CARB Profile No. 1902. TACs from construction dust were estimated from CARB Profile No. 420.

Air Dispersion Modeling

Air dispersion modeling was used to estimate ambient criteria pollutant and TAC concentrations for 2005 and the 2020 alternatives. The project-related ambient concentrations were added to measured (2005) or estimated (2020) background concentrations for comparison to the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

The predicted incremental difference in TAC concentrations between the 2020 alternatives and the 2005 Existing Conditions was used to assess the project specific incremental health risks to the potentially exposed populations described in the Impacts Analysis section below.

The air dispersion analysis was performed in accordance with USEPA, CARB, and SCAQMD modeling guidelines and the modeling protocol developed for this project and is described in Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C). The results of the air dispersion analysis was used in conjunction with the chemical specific emissions rates discussed in Section 3.0 to estimate ambient criteria pollutant and TAC concentrations. The air dispersion analysis requires the following: (1) selection of the dispersion model, (2) evaluation of potential terrain considerations, (3) selection of appropriate dispersion coefficients based on land use, (4) selection and/or preparation of meteorological data, (5) identification of source locations and modeling parameters, (6) selection of receptor locations, and (7) selection of appropriate averaging time periods. Each of these steps is summarized in the sections that follow.

Model Selection

The first step in an air dispersion analysis is the selection of an applicable model. The most commonly used air models for dispersion of pollutant emissions from airports are FAA's EDMS program, which uses USEPA's AERMOD model, and USEPA's Industrial Source Complex Short-Term 3 (ISCST3) dispersion model. In addition, CAL3QHC or CALINE4 are often used to assess CO concentrations at roadway intersections.

The FAA has developed EDMS for analyzing airport criteria pollutant emissions. In the current release, EDMS Versions 4.0 and later implement AERMOD (USEPA 1998a), an air dispersion model developed by the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC). AERMIC's objective is to develop a replacement for USEPA's ISCST3 air dispersion model (USEPA 1995b and c) that meets the following criteria: (1) adopts ISCST3's input/output computer architecture; (2) updates, where practical, ISCST3 model algorithms with newly developed or current state-of-the-art modeling techniques; and (3) ensures that the source and atmospheric processes presently modeled by ISCST3 will continue to be handled by AERMOD (USEPA 1998a and 2002a).

For analysis of the Proposed Project and project alternatives, the EDMS/AERMOD system and CALINE4 were selected for the following reasons:

- The FAA requires EDMS be used to assess air quality impacts at airports (63FR18068).
- CALINE4 is the preferred regulatory model for conducting roadway intersection CO concentration analyses in California (Caltrans 1997).

Project-related concentrations of criteria pollutants were calculated directly from EDMS/ AERMOD (for all on-airport sources) and from CALINE4 (from off-airport roadway intersections), with the following exception: the annual NO_2 NAAQS and 1-hour NO_2 CAAQS determination required supplemental analyses since the EDMS/AERMOD model calculates total NO_X emissions and concentrations, not NO_2 impacts. The supplemental NO_2 approaches include the USEPA's Multi-tiered Screening Approach for the annual NO_2 analysis described in 40 CFR 51 Appendix W, and the SCAQMD localized significance threshold (LST) method for the 1-hour NO_2 analysis.

For the Multi-tiered Screening Approach to determine annual NO_2 concentrations from estimated annual NO_X values, hourly monitoring data collected at the SCAQMD North Long Beach monitoring station (SCAQMD Station No. 072) were used. The data for 2002 through 2004 were obtained, and these data indicated that the annual average ratio of NO_2-to-NO_X is 0.48. This value compares well with the value of 0.47 reported by Chico et al. (1998) for the 1994 to 1996 time period. For purposes of the human health risk assessment, the annual NO_X concentration determined from EDMS/AERMOD was multiplied by 0.48 to determine the annual NO_2 concentration at each receptor location.

To develop annual concentrations for the 15 to 20 TACs typically considered at airports, dispersion factors, sometimes-called chi-over-Q (/Q) values, were used. The /Q value for each group of similar sources was calculated from AERMOD results. These /Q values represent the ratio between concentration and emission rate as expressed as units of concentration per unit of emissions. The /Q values were developed for each group of sources that have similar dispersion characteristics and speciation profiles. The /Q values were then multiplied by the chemical-specific emission rates to determine TAC concentrations at each receptor.

Building downwash is the effect of structures on the dispersion of emissions from nearby point (stack) sources. No point sources within the Airport terminal improvement area have been identified as significant emission sources of TACs. Therefore, an analysis of building downwash was not conducted.

Terrain

An important consideration in an air dispersion modeling analysis is whether the terrain in the modeling area is simple or complex (i.e., terrain above the effective height of the emission point). Complex terrain can affect the results of a dispersion analysis involving point and volume sources, but does not affect the predicted results for area sources (USEPA 1995c). Terrain elevations were obtained from digital elevation model (DEM) files[1] of the United States Geological Survey (USGS) maps for the following 7.5 Minute Quadrangles: Long Beach, Los Alamitos, Torrance, and San Pedro. The proposed modeling area contains both simple and complex terrain. USGS elevation information was used in the air dispersion modeling analysis to identify the terrain height of modeled sources and receptor points.

Land Use

Auer's (Auer 1978) method of classifying land-use as either rural or urban was used to analyze the surrounding region. This method calls for analysis of a three-kilometer radius around a facility to determine if the majority of the land can be classified as either rural (i.e., undeveloped) or urban. A review of Long Beach, Lakewood, and Signal Hill zoning maps as well as aerial photos indicates that the vast majority of the land within three kilometers of the Airport is urban and, therefore, urban dispersion coefficients were used in the modeling.

Meteorological Data

An extensive review of meteorological data was conducted before the final selection of appropriate data was made. The steps followed in selecting the data are described in Attachment G to the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C). Selection of the data was also coordinated with the SCAQMD[2,3] prior to use in the analysis. All dispersion analyses were conducted using 1985 hourly meteorological data obtained from the Airport. Use of this data satisfies USEPA modeling requirements. Processing of the meteorological data followed USEPA guidance as noted in the protocol (Attachment A to the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport*).

Source Parameters

The following emission sources identified in the emission inventories were modeled: (1) aircraft, (2) APU, (3) GSE, (4) ground access vehicles, (5) fuel storage, and (6) building heaters/boilers for the new terminals. The locations of the sources were determined from the Airport Layout Plan, maps, aerial photos and other information provided by the City. The general methodology used to model each source type is described below; detailed methodology is included in the protocol (Attachment A to the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport*).

Aircraft

Emissions from aircraft operations at the Airport were modeled as area sources in AERMOD, as generated in EDMS. Actively used taxiways and runways entered into EDMS generated groups of area sources representing aircraft on the runways, taxiways, as well as in approach and

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1 Obtained from: http://data.geocomm.com/catalog/US/61069/2389/group4-3.html, March 2005.
2 Meeting with SCAQMD, August 30, 2005, regarding LGB Terminal Improvement Project – Draft Modeling Protocol dated August 9, 2005
3 Email from SCAQMD (T. Chico) on September 2, 2005.

departure airspace. EDMS 4.3 calculates PM emissions from many, but not all, aircraft. Therefore, the emissions file created by EDMS and used as input to the AERMOD dispersion analysis was used to determine aircraft PM /Q values. These values were then used to estimate total aircraft PM concentrations by multiplying the /Q values by total PM emissions.

As discussed previously, aircraft emissions occur in four operating modes (taxi/idle, approach, takeoff, and climb-out). For operations at the Airport, taxiway source groups were used to model the emissions from taxi/idle mode, runway source groups to model emissions during takeoff mode, arrival space source groups to model emissions during approach, and departure space source groups to model the emissions during climb-out modes.

Ground Access

CO Hot Spot Analysis

Dispersion analysis of CO concentrations at roadway intersections was conducted for all 19[4] intersections identified by the traffic consultant as the most likely to be impacted by the project. The analysis was conducted following the recommended California Department of Transportation methodology (Caltrans 1997), using the CALINE4 model (Benson 1989).

On-Airport Roadway/Parking Dispersion

The locations of ground access sources (traffic and parking) were determined from the airport layout plan as well as recent aerial photos and maps. Roadways and parking facilities located within airport property were modeled as area sources, as generated by EDMS.

Ground Support Equipment (GSE)/Auxiliary Power Unit (APU)

Pollutant emissions from GSE/APU operations were modeled by EDMS/AERMOD as volume sources. The locations of GSE/APU sources were at the commercial aircraft parking and cargo areas.

Stationary Sources

Stationary sources affected by the Proposed Project and project alternatives were modeled. These sources included fuel farms and new terminal building heaters/boilers. Fugitive emissions from tanks in the fuel farms were modeled as elevated area sources (at the tank height elevation), and the building heaters/boilers were modeled as point (stack) sources.

Construction Sources

Construction source dispersion was modeled following the general methodologies presented in the SCAQMD's Localized Significance Threshold Methodology document (SCAQMD 2003). CARB's OFFROAD was used to estimate emissions, as noted above.

Receptor Locations

Ambient concentrations of criteria pollutants and TACs were estimated at 348 receptor locations around the Airport. Receptors were located at the following general locations in and around the Airport:

4 For the Project alternatives, 20 intersections were analyzed which included a new proposed airport entrance/exit onto Lakewood Boulevard.

- Along the airport security fence.
- Along the airport property line.
- At on-site worker locations (including ground handlers, rental car facility operators, valet parking attendant locations, and other commercial sites within the airport property line).
- At nearby residential sites.
- At nearby schools.
- At nearby medical facilities.
- At nearby commercial/industrial worker locations.
- At nearby recreational sites (golf courses).

The detailed receptor coordinates and receptor type are presented in Attachment H to the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Dispersion Factor Averaging Time

The calculation of criteria pollutant concentrations was based on the averaging period(s) included in the NAAQS and/or CAAQS for each of the pollutants analyzed. Two averaging periods were used in the TAC HRA dispersion analysis. The annual average concentration for the meteorological data period was calculated for each TAC used in estimating cancer and chronic non-cancer risk. Maximum one-hour concentrations were calculated for use in estimating acute non-cancer risk.

Concentrations of Toxic Air Pollutants

As discussed above, airborne off-site transport of vapor phase and particulate bound TACs from the facility to the receptors identified above were analyzed. In summary, the process used to estimate the off-site ambient air concentrations of TACs included:

(1) Estimation of total VOC or PM emission rates from aircraft, ground access, GSE/APU, construction, and on-airport stationary sources.
(2) TAC-specific emission rate for each source was determined by multiplying the VOC or PM emissions by the TAC-specific weight fraction from the appropriate source speciation profile.
(3) The annual average dispersion factors, /Q's, at the receptors of concern were obtained from the air dispersion analysis.
(4) The /Q factors were multiplied by the TAC-specific emission rates determined in the Step 2 to obtain TAC-specific annual air concentrations at the receptors of concern for each scenario.
(5) Acute (1-hour) TAC concentrations from all sources were calculated directly from AERMOD for each TAC with an acute reference exposure level.
(6) Incremental TAC concentrations for each scenario were determined by subtracting the 2005 Existing Conditions concentrations from TAC concentrations for each future 2020 scenario.

<u>Health Risk Analysis</u>

To characterize possible human health impacts of implementation of the Proposed Project on the communities nearest the Airport, CDM prepared a HHRA, which is included in its entirety as in Appendix C. The methods used in preparing the HHRA are consistent with guidelines provided by the California Environmental Protection Agency (Cal/USEPA), Department of Toxic Substances Control (DTSC) in Supplemental Guidance for Human Health Multimedia Risk

Assessment Hazardous Waste Sites and Permitted Facilities (Cal/USEPA 1992); Cal/USEPA, California Air Pollution Control Officers Association (CAPCOA) Air Toxics “Hot Spots” Revised Risk Assessment Guidelines (CAPCOA 1993), Office of Environmental Health Hazard Assessment (Cal/USEPA) in Air Toxic Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments and its four technical support documents, Cal/USEPA (1999, 2000a, 2000b, 2002b, and 2003); and US Environmental Protection Agency (USEPA) in Risk Assessment Guidance for Superfund (RAGS) (USEPA 1989) and supplements. The SCAQMD Rules (particularly Rules 1401 and 1402) were also consulted during preparation of this document. The methodology is summarized below.

The HHRA was conducted in the following steps:

(1) Estimation of chemical emissions from operational sources under conditions existing in 2005 ("2005 Baseline Conditions" scenario), and the Proposed Project the maximum level of facilities improvements;
(2) Calculation of possible impacts to air quality using emissions estimates and refined air dispersion modeling;
(3) Selection of TACs of concern for airport operations;
(4) Evaluation of possible exposures to TACs;
(5) Evaluation of toxicity of TACs;
(6) Characterization of possible cancer risks and chronic and acute non-cancer hazards; and
(7) Evaluation of uncertainties in the risk assessment process. The results of the risk assessment are used to characterize possible human health impacts of implementation of the project on communities nearest to the Airport.

The first two steps in this process are described above in the discussion of emissions estimates. Steps 3 through 6 are briefly summarized below and extensively detailed in the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

It should be noted that the methods used in the HHRA were conservative; as a result, they are more likely to overestimate than underestimate possible health risks. For example, risks and hazards were calculated for individuals that are likely to be exposed at locations where TAC concentrations are predicted to be highest. Further, individuals were assumed to be exposed for 250 days of the year 24 hours per day, and for many (70) years to maximize estimates of possible exposure. Consequently, the resulting incremental cancer risk estimates represent upper-range predictions of exposure, and therefore health risk, which may be associated with living near or working near and breathing emissions from the Airport.

Summary of Selection of TACs of Concern

TACS of Concern for Inhalation Exposure

TACs of concern include substances that, because of their toxicity and/or amounts released, are selected to be the main focus of a risk analysis. Consistent with USEPA risk assessment guidance (USEPA 1989), a concentration-toxicity screen was used to select the TACs that were carried through to the risk assessment for the Proposed Project. Specifically, a potency-weighted emissions screening method was used for all TACs identified in Airport-related emissions. Those chemicals that were determined to contribute significantly to the overall risk from inhalation exposure were identified as the primary TACs of concern and became the focus of the remainder of the risk analysis.

The analysis identified eleven TACs of concern for Airport-related sources, including diesel particulate matter (PM), acrolein, formaldehyde, 1-3-butadiene, benzene, chromium VI, acetaldehyde, lead, and manganese, cobalt and napthalene. In combination, these TACs are expected to account for about 99 percent of all potency-weighted emissions that could be associated with Airport operations. However, some TACs that are likely to contribute negligibly to potential risks and hazards were also carried through the risk assessment. Polycyclic aromatic hydrocarbons (PAHs) have been of concern to the public on other recent health risk assessments (for example, HHRA for the LAX Master Plan) and were included to ensure that chemicals that might be recognized by the public were included. In addition, nickel was included because nickel is considered a known human carcinogen following inhalation.

TACs of Concern for Multi-Pathway Analysis

Toxic air contaminants enter the body through a number of routes: inhalation, absorption through skin, and ingestion from contaminated food, water, milk, and soil. To account for uptake of contaminants through routes other than inhalation, a multi-pathway screening evaluation was conducted. A multi-pathway analysis includes evaluation of potential exposures to chemicals emitted from a facility and deposited onto surface soil. From soils, TACs could theoretically be incidentally ingested, dermally contacted, or taken up into garden vegetables.

SCAQMD's multi-pathway (MP) factors were used to determine the potential multi-pathway exposure associated with the Proposed Project. MP factors are estimates of an appropriate multiplier that can be applied to estimates of risk or hazard due to inhalation exposure to account for exposure through non-inhalation pathways. For example, an MP factor of 1 suggests that multi-pathway exposures are insignificant, while an MP factor of 10 suggests that multi-pathway risks or hazards could be 10 times greater than those associated with inhalation. MP factors were used in this assessment as an initial screening step to determine if a TAC of concern should be further assessed for exposure pathways other than inhalation. Separate MP factors are provided and were used in the screening analysis for urban residential and worker exposure situations since the potential routes of exposure for these receptors vary.

The analysis identified three multi-pathway TACs of concern polycyclic aromatic hydrocarbons (PAHs), dibenzo(a,h)anthracene, and lead. All of these TACs have MP factors greater than one, suggesting that non-inhalation exposure pathways could be important.

TACs of Concern for Acute Exposure

Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA) has developed an acute reference exposure level (REL) for acrolein, and several other TACs of concern related to airport emissions. The potential acute effects of these TACs were screened to identify TACs of concern for acute exposure for the Proposed Project. This screening showed that acrolein is responsible for essentially all predicted non-cancer health hazards associated with airport operations. However, due to public concern regarding formaldehyde, potential incremental acute non-cancer hazards associated with formaldehyde were also evaluated. Thus, the full analysis of TACS of concern for acute exposure included evaluation of potential acute non-cancer hazards for acrolein and formaldehyde.

<u>Exposure Assessment</u>

In the exposure assessment, populations potentially exposed to TACs associated with airport operations were identified and chemical intakes were estimated for individuals within these populations. The identification of potentially exposed populations was based on current land uses near the Airport, and exposure to TACs via inhalation. The Exposure scenarios selected for the HHRA provide an upper range health impact assessment that protects the most highly exposed and sensitive populations as well as the general population.

Summary of Receptor Populations

Identification of potentially exposed populations is based on current land uses near the Airport as well as exposure to TACs via inhalation. As previously discussed, inhalation is the only exposure pathway identified as potentially important. The area surrounding the Airport includes residential and commercial land uses. The nearest residential and mixed use communities are located across the street from the Airport fence line on the southeast corner. Predominant wind directions at the Airport are from the south, the west, and west-northwest. Thus, individuals living or working to the north and east of the airport would be expected to incur the greatest exposures to TACs released from the airport and carried by winds into the community.

Certain subpopulations may be more sensitive or susceptible to negative health impacts caused by environmental contaminants than the population at large. Locations where they are found are called sensitive receptors. For the purposes of the HHRA, the following sensitive receptor locations were identified: schools, medical facilities, and residential areas.

Sensitive population groups are included by the analysis of child and adult residential populations in the HHRA. It should be noted that children in daycare centers and preschools were not separately evaluated because children in this age range were evaluated as residents living immediately adjacent to the Airport. Resident children were assumed to be present in the residential areas 24 hours per day. Therefore, the evaluation for resident children living near the airport would protect people in other sensitive receptors further away from the airport.

Based on the preceding discussions as well as on human activity and land use patterns in the vicinity of the Airport, the following off-Airport populations were evaluated: residential adults and children, off-Airport workers, and elementary school children. In addition, the HHRA evaluated potential exposures for airport workers—the population expected to receive the highest exposures to TACs.

Other populations such as open space recreational area users and airport passengers were not specifically evaluated because their exposures to TACs are intermittent and short-term. However, as previously stated, all studied populations were evaluated for multi-pathway exposure to PAHs, dibenzo(a,h)anthracene, and lead.

Exposure Assumptions

<u>On-Airport Worker</u>

For the purposes of the health risk analysis, the on-Airport worker[5] was assumed to be in contact with TACs throughout a normal workday. Occupational exposures were assessed by comparing maximum 8-hour concentrations of TACs near gates and aprons, estimated through air dispersion modeling, with PEL-TWAs (Permissible Exposure Level-Time Weighted Averages). Pursuant to the American Conference of Governmental Industrial Hygienists (ACGIH) guidelines, health impacts for the on-Airport workers are unlikely if TAC concentrations are below PEL-TWAs.

[5] For purposes of this analysis, the on-Airport worker is a ramp worker who works in close proximity to aircraft throughout the workday. Because this individual is at higher risk for exposure to TACs, a special Cal/OSHA analysis was prepared to quantify that risk.

Adult and Child Residents and Elementary School Students

To estimate potential cancer risks and the potential for adverse chronic non-cancer health hazards for residential receptors and elementary school children, chronic daily intakes (CDIs) for the inhalation pathway were estimated. Two types of CDI were calculated. Lifetime Average Daily Dose (LADD) was calculated for exposure to carcinogens because cancer risk is thought to be cumulative over a lifetime. Average Daily Dose (ADD) was calculated for exposure to non-carcinogens and for carcinogens with significant chronic non-cancer health effects because chronic non-cancer health impacts are more closely related to average daily intake than cumulative exposure.

For residents, exposure was assumed to occur 24 hours per day (USEPA 1991). Consistent with USEPA (1991) and Cal/EPA (1992) guidance, an exposure frequency of 350 days per year was assumed for both the adult and child residents. This corresponds to residents being present in their homes 7 days a week for 50 weeks a year (or about 96 percent of the time) with approximately 2 weeks (or 15 days) spent away from home.

Exposure duration for adult residents was assumed to be 70 years (SCAQMD 2005) when estimating exposure to carcinogens. It should be noted that according to USEPA (1997), a 30-year exposure duration is about the 90th percentile for time spent at one residence. Use of the upper range estimate of 70 years of possible exposure duration, along with other conservative exposure assumptions, provides estimates of risks and hazards that are unlikely to be exceeded even for those people living nearest to the Airport.

Exposure duration for estimating chronic non-cancer hazards was assumed to be nine years and applied only to children. Consistent with regulatory guidance (USEPA 1991, Cal/EPA 1992, 1994), an age-adjusted method was used to evaluate potential carcinogenic effects. This approach accounts for differences in intake rates, body weights, and exposure duration for children and adults and is described in detail in Section 5 of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Off-Airport Worker

The HHRA assumed that off-Airport workers would be exposed to airport chemicals eight hours per day for 245 days per year (Cal/EPA 2003). This exposure frequency corresponds to working 5 days/week for 49 weeks/year. Further, workers were assumed to be on the same job for 40 years, which is consistent with the assumptions of Proposition 65 (Cal/EPA 2003).

Highest Incremental Cancer Risks and Chronic Non-Cancer Hazards

Differences between the 2005 Baseline and the 2011 and 2020 Optimized Flights scenarios were estimated by subtracting the 2005 Baseline TAC concentrations modeled from a project scenario's TAC concentrations modeled for each grid point and identifying the locations where incremental changes in TAC concentrations resulted in the highest estimates for cancer risks and non-cancer hazard. These incremental risks and hazards represent those for the maximum exposed individual (MEI) and are used to determine the significance of impacts under CEQA.

Incremental cancer risks and chronic non-cancer health hazards were calculated for adult residents, resident children ages 0 to 9 years, elementary-aged school children, and workers at off-Airport locations where the highest air concentrations for TACs were predicted. Differences in the locations of highest increments were observed.

3.2.1 EXISTING CONDITIONS

Regulatory Setting

In response to concerns about air pollution, Federal, State, and local authorities have adopted various rules and regulations requiring evaluation of air quality impacts of planned projects and appropriate mitigation for air pollutant emissions. The following discussion focuses on current air quality planning efforts and the responsibilities of agencies involved in these efforts. A discussion of ambient air quality standards is also provided.

Federal

The USEPA is responsible for implementation of the Federal Clean Air Act (CAA). The CAA was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, 1990, and 1997). Under the authority granted by the CAA, USEPA has established NAAQS for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). Table 3.2-2 presents the NAAQS that are currently in effect for criteria air pollutants. O_3 is a secondary pollutant, meaning that it is formed from reactions of “precursor” compounds under certain conditions. The primary precursor compounds that can lead to the formation of O_3 include volatile organic compounds (VOC) and oxides of nitrogen (NO_X).

The CAA also specifies future dates for achieving compliance with the NAAQS and mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met. The 1990 amendments to the CAA identify specific emission reduction goals for air basins not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones.

The cities of Long Beach, Lakewood, and Signal Hill are included in the South Coast Air Basin (SoCAB), which is designated as a federal non-attainment area for O_3, PM_{10}, $PM_{2.5}$, and CO.[6] Non-attainment designations are categorized into levels of severity based on the level of concentration above the standard, which is also used to set the required attainment date. The SoCAB was reclassified in 1998 from non-attainment to attainment/maintenance for NO_2 since concentrations of that pollutant have dropped below (became better than) the NO_2 NAAQS in the early 1990s. Attainment/maintenance means that the pollutant is currently in attainment and that measures are included in the SIP to ensure that the NAAQS for that pollutant are not exceeded again. Table 3.2-2 presents the attainment designation for each of the federal criteria air pollutants.

[6] At its March 4, 2005 meeting, the SCAQMD governing board announced that the SoCAB has met the federal CO NAAQS and will formally seek attainment designation from the USEPA. The USEPA will have 18 months upon receipt to process the SCAQMD’s redesignation request.

TABLE 3.2-2
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	CAAQS
Carbon monoxide (CO)	1 hour	35 ppm (40 mg/m^3)	N/A	20 ppm (23 mg/m^3)
	8-hour	9 ppm (10 mg/m^3)	N/A	9.0 ppm (10 mg/m^3)
Ozone (O_3)	1 hour	N/A[a]	N/A	0.09 ppm (180 μg/m^3)
	8-hour	0.08 ppm (157 μg/m^3)	Same as primary	0.07 ppm[b] (137 μg/m^3)
Nitrogen dioxide (NO_2)	1 hour	N/A	N/A	0.25 ppm (470 μg/m^3)
	Annual	0.053 ppm100 μg/m^3)	Same as primary	N/A
Sulfur dioxide (SO_2)	1 hour	N/A	N/A	0.25 ppm (655 μg/m^3)
	3 hour	N/A	0.5 ppm (1300 g/m^3)	N/A
	24 hour	0.14 ppm (365 μg/m^3)	N/A	0.04 ppm (105 μg/m^3)
	Annual	0.03 ppm (80 μg/m^3)	N/A	N/A
Respirable Particulate Matter (PM_{10})	24 hour	150 μg/m^3	Same as primary	50 μg/m^3
	Annual	50 μg/m^3	Same as primary	20 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24 hour	65 μg/m^3	Same as primary	N/A
	Annual	15 μg/m^3	Same as primary	12 μg/m^3
Lead (Pb)	Monthly	N/A	N/A	1.5 μg/m^3
	Quarterly	1.5 μg/m^3	Same as primary	N/A
Sulfates (SO_4^{2-})	24 hour	N/A	N/A	25 μg/m^3
Hydrogen sulfide (H_2S)	1 hour	N/A	N/A	0.03 ppm (42 μg/m^3)
Vinyl chloride	24 hour	N/A	N/A	0.01 ppm (26 μg/m^3)

a. The ozone 1-hour NAAQS was revoked by USEPA on June 15, 2005.
b. The ozone 8-hour CAAQS was approved by CARB on April 28, 2005, and is expected to become effective in early 2006.
mg/m^3 milligrams per cubic meter
N/A Not applicable
ppm parts per million by volume
μg/m^3 micrograms per cubic meter
Sources: 40 CFR 50; and 17 CCR 70200.

State

The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the State to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CAAQS are at least as stringent, and often more stringent than the NAAQS. The currently applicable CAAQS are presented with the NAAQS in Table 3.2-2. The attainment status with regard to the CAAQS is presented in Table 3.2-3 for each pollutant.

TABLE 3.2-3
SOUTH COAST AIR BASIN ATTAINMENT STATUS[a.]

Pollutant	National Standards	California Standards
Ozone (O_3)	Nonattainment – Severe 17	Nonattainment
Carbon monoxide (CO)	Nonattainment - Serious[b]	Nonattainment - Transitional[c]
Nitrogen dioxide (NO_2)	Attainment - Maintenance	Attainment
Sulfur dioxide (SO_2)	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Nonattainment - Serious	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Lead (Pb)	Attainment	Attainment

a. Status as of September 19, 2005.
b. The SCAQMD will formally seek redesignation to attainment/maintenance status based on its recent attainment of the CO standard.
c. The Los Angeles County portion of the SoCAB was redesignated by CARB as attainment for the CO CAAQS, awaiting final State administrative process to officially change designation.

Source: CDM 2005.

The CARB has been granted jurisdiction over a number of air pollutant emission sources that operate in the State. Specifically, CARB has the authority to develop emission standards for on-road motor vehicles, as well as for stationary sources and some off-road mobile sources. In turn, CARB has granted authority to the regional air pollution control and air quality management districts to develop stationary source emission standards, issue air quality permits, and enforce permit conditions.

Regional

South Coast Air Quality Management District (SCAQMD)

The SCAQMD has jurisdiction over an area of 10,743 square miles consisting of Orange County, the non-desert portions of Los Angeles, Riverside and San Bernardino counties, and the Riverside County portions of the Salton Sea Air Basin and Mojave Desert Air Basin. SoCAB is a subregion of the SCAQMD's jurisdiction, which covers an area of 6,745 square miles and includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. While air quality in this area has improved, the basin requires continued diligence to meet air quality standards.

The SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the CAAQS and NAAQS. These plans require, among other emissions-reducing activities, control technology for existing sources; control programs for area sources and indirect sources; a permitting system designed to ensure no net increase in emissions from any new or modified permitted sources of emissions; transportation control measures; sufficient control strategies to achieve a five percent or more annual reduction in emissions (or 15 percent or more in a three-year period) for Reactive Organic Compounds (ROC),[7] NO_X, CO, and PM_{10}; and demonstration of compliance with the CARB's established reporting periods for compliance with air quality goals.

[7] Reactive organic compounds (ROC) and volatile organic compounds (VOC) are designations made by CARB and USEPA, respectively, for organic compounds that can react with NOx in the presence of sunlight to form O_3. Slight variations exist between the two designations; for example, the CARB definition of ROC includes ethane while the USEPA definition of VOC does not.

The current, USEPA-approved SIPs for each federal nonattainment or maintenance pollutant in the SoCAB are summarized below:

- O_3 – SIP approved by USEPA on April 10, 2000 (65 FR 18903), based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP.

- CO – SIP approved by USEPA on April 21, 1998 (63 FR 19661), based on the 1997AQMP. The attainment demonstration lapsed in 2000. The 2003 AQMP provides the basis for a future maintenance plan, and such a CO maintenance plan was prepared in March 2005 and submitted to USEPA along with a request for redesignation to attainment status.
- PM_{10} – SIP approved by USEPA on April 18, 2003 (68 FR 19315), based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 1997 AQMP submitted in a status report to USEPA in 2002.

- NO_2 – SIP approved by USEPA on July 24, 1998 (63 FR 39747), based on the 1997 AQMP. In this SIP approval, USEPA also redesignated the SoCAB from nonattainment to attainment/maintenance for NO_2.

On August 1, 2003, the SCAQMD adopted a comprehensive update, the 2003 AQMP for the basin. The 2003 AQMP outlines the air pollution control measures needed to meet now superseded federal 1-hour standard for O_3 by 2010,[8] and to meet the federal PM_{10} standard by 2006. It also demonstrates how the federal standard for CO, achieved for the first time at the end of 2002, will be maintained. Lastly, the plan takes a preliminary look at what will be needed to achieve new and more stringent health standards for O_3 and $PM_{2.5}$. The 2003 AQMP was approved by CARB and submitted to USEPA for its final approval on January 9, 2004.

In adopting the 2003 AQMP, the SCAQMD (1) committed to analyzing 12 additional long-term control measures, such as requiring the electrification of all cranes at ports; (2) set a target for distributing needed long-term emission reductions between SCAQMD, CARB and USEPA; (3) assigned emission reductions to the USEPA (in the event that USEPA rejects the plan due to the assignment, the plan will drop the provision); and (4) forwarded to CARB and USEPA a list of more than 30 specific measures for consideration to further reduce emissions from on- and off-road mobile sources and consumer products. The 2003 AQMP also identifies 26 air pollution control measures to be adopted by the SCAQMD to further reduce emissions from businesses, industry and paints. It also identifies 22 measures to be adopted by CARB and the USEPA to further reduce pollution from cars, trucks, construction equipment, aircraft, ships, and consumer products.

The SCAQMD also adopts rules to implement portions of the AQMP. Several of these rules may apply to construction or operation of the Proposed Project. For example, Rule 403 requires the implementation of best available fugitive dust control measures during active operations capable of generating fugitive dust emissions from on-site earth-moving activities, construction/ demolition activities, and construction equipment travel on paved and unpaved roads.

Certain stationary sources of air pollution that may be part of the Proposed Project (e.g., heaters and generators) may require permits from the SCAQMD pursuant to Rules 201, 202 and 203. Emission increases related to those sources may also be subject to SCAQMD Regulation XIII or Regulation XXX which, among other things, requires that Best Available Control Technology

[8] In 1997, the USEPA adopted a new 8-hour O_3 NAAQS, and on June 15, 2005, the previous 1-hour O_3 NAAQS was revoked.

(BACT) be utilized to reduce pollutants and that any increases of criteria air pollutants be offset by achieving equivalent emission reductions at a facility within the SoCAB. Emergency equipment, however, is exempt from modeling and offset requirements (Rule 1304) and does not require a health risk assessment (Rule 1401).

In addition to the AQMP and its rules and regulations, the SCAQMD published a handbook (*CEQA Air Quality Handbook*; most recent version: November 1993) that is intended to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts for both land use and permitting projects. The Handbook provides standards, methodologies and procedures for conducting air quality analyses in EIRs and was used extensively in the preparation of this analysis. The Handbook was used to develop the project air quality and human health risk assessment protocol contained in Attachment A of the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C).

Southern California Association of Governments (SCAG)

Under the conformity regulations (40 CFR 93) of the CAA, SCAG is the metropolitan planning organization (MPO) responsible for coordinating the development of transportation infrastructure in the Southern California region such that air quality objectives as well as transportation goals are included in regional transportation plans. SCAG estimates population and business growth in the region, and uses these estimates to predict future vehicle miles traveled (VMT) which represents demand on the regional roadway system. Demand for ports, airports, and train stations are also determined. From the demand estimates, SCAG develops the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) to guide transportation growth and infrastructure development to meet the demand and air quality requirements in the region. The forecasts are updated approximately every three years. The VMT as well as activities predicted for ports, airports, and train stations are used by the SCAQMD in developing updates to the AQMPs discussed above.

The 2004 RTP assumes that LGB will accommodate 3.8 million annual passengers (MAP) by 2030.

Los Angeles County Congestion Management Plan

The Congestion Management Plan (CMP) for the County of Los Angeles has been developed to meet the requirements of Section 65089 of the California Government Code. In enacting the CMP statute, the State legislature noted the increasing concern that urban congestion was impacting the economic vitality of the State and diminishing the quality of life in many communities. The CMP was created to further the following objectives:

- To link land use, transportation, and air quality decisions.
- To develop a partnership among transportation decision makers to encourage appropriate transportation solutions that include all modes of travel.
- To propose transportation projects that are eligible for State gas tax funds.

Local

The cities of Long Beach and Lakewood have adopted General Plan Air Quality Elements to aid the greater Los Angeles region in attaining state and federal ambient air quality standards at the earliest feasible date, while still maintaining economic growth and improving the quality of life.

These Air Quality Elements acknowledge the inter-relationships between transportation and land use planning in meeting mobility and clean air goals. By adopting Air Quality Elements, both cities are seeking to achieve consistency with the AQMP, RTP, and CMP.

<u>City of Long Beach General Plan Air Quality Element</u>

Contained in the City of Long Beach General Plan Air Quality Element are numerous goals, policies, and actions that are intended to improve air quality throughout the City. They are based on the following guiding principles:

(1) To achieve air quality improvements in such a manner that sustains current economic development while encouraging future growth.

(2) To improve the quality of life for citizens by providing greater opportunities, conveniences, and choices.

(3) To reinforce local mobility goals by reducing peak-hour traffic congestion.

(4) To foster behavior change through public information and education, incentives, and pricing that reflects total societal costs for administration and enforcement.

<u>Existing Air Quality Conditions and Trends</u>

Regional Air Quality

The distinctive climate of the SoCAB is determined primarily by its terrain and geographical location. Regional meteorology is dominated by a persistent high-pressure area, which commonly resides over the eastern Pacific Ocean. Seasonal variations in the strength and position of this pressure cell cause changes in the weather patterns of the area. Warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and moderate humidity characterize local climatic conditions. This normally mild climatic condition is occasionally interrupted by periods of hot weather, winter storms, and hot easterly Santa Ana winds.

The SoCAB is an area of high air pollution potential, particularly from June through September. This condition is generally attributed to the large amount of pollutant emissions, light winds and shallow vertical atmospheric mixing. This frequently reduces pollutant dispersion, thus causing elevated air pollution levels. Pollutant concentrations in the SoCAB vary with location, season and time of day. Concentrations of O_3, for example, tend to be lower along the coast, higher in the near inland valleys and lower in the far inland areas of the Basin and adjacent desert.

Over the past 30 years, substantial progress has been made in reducing air pollution levels in southern California. The SoCAB previously was in non-attainment for all NAAQS, except SO_2. The basin is now in attainment for NO_2, lead, SO_2, and CO. PM_{10} and ozone levels, while reduced substantially from their peak levels, are still above the respective NAAQS. Although 2003 resulted in the worst smog season in seven years, 2004 concentrations have dropped down closer to the 2002 levels.

The SCAQMD published a Basin-wide air toxics study (MATES II, Multiple Air Toxics Exposure Study, March 2000). The MATES II study represents one of the most comprehensive air toxics studies ever conducted in an urban environment. The study determined the cancer risk from toxic air emissions throughout the Basin by conducting a comprehensive monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to fully characterize health risks for those living in the Basin. The study concluded that the average carcinogenic risk in the Basin is approximately 1,400 in one million. Mobile sources (e.g., cars, trucks, trains, ships, aircraft) represent the greatest contributors. About 70 percent of all risk is attributed to diesel particulate emissions, about 20 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde), and about 10 percent of all carcinogenic risk is attributed to stationary sources (which include industries and other certain businesses such as dry cleaners and chrome plating operations).

Local Air Quality in the Airport Vicinity

The SCAQMD maintains a network of air quality monitoring stations located throughout the Basin. As defined by the SCAQMD, the monitoring station most representative of existing air quality conditions in the project area is the South Los Angeles County Coastal Monitoring Station No. 072 (also referred to herein as the North Long Beach Monitoring Station), located in the 3600 block of North Long Beach Boulevard, in the City of Long Beach, approximately one mile west of the Airport's western boundary. Criteria pollutants, including O_3, CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2 are monitored at this station.

Air Quality Trends in Long Beach

The 10-year trend in pollutant concentrations can be seen in the 1995 through 2004 data presented in Table 3.2-4. Table 3.2-5 presents the 10-year trend in the number of days that the NAAQS or CAAQS were exceeded for each criteria pollutant. The trends indicate that between 1995 and 2004:

- CO concentrations have dropped 56 percent for the 1-hour average and 49 percent for the 8-hour average

- NO_2 concentrations have dropped 43 percent for the 1-hour average and 24 percent for the annual average

- PM_{10} concentrations have dropped 51 percent for the 24-hour average and 14 percent for the annual average

- O_3 concentrations have dropped 18 percent for the 1-hour average and 4 percent for the 8-hour average (since 1996)

Since 1995, the Long Beach area has been in attainment of the federal CO, NO_2, SO_2, PM_{10}, and Pb standards, as well as the state CO, NO_2, SO_2, and Pb standards. In 2004, only the state PM_{10}, federal $PM_{2.5}$, and state $PM_{2.5}$ standards were exceeded in Long Beach. All other pollutant concentrations, including those for O_3, were at or better than the standards.

<u>Existing Air Quality in Long Beach</u>

Table 3.2-6 presents the existing air quality used to represent CEQA baseline (2005) conditions, which was determined from the highest measurements for each pollutant from the most recent three-year period (2002-2004). As noted above, Long Beach is currently in attainment of all criteria pollutant standards except the PM_{10} CAAQS, and $PM_{2.5}$ NAAQS and CAAQS. Also, one 8-hour period over the last three years has an O_3 concentration that exceeded the new 8-hour O_3 CAAQS.

TABLE 3.2-4
10-YEAR AMBIENT AIR QUALITY TRENDS IN THE VICINITY OF LONG BEACH AIRPORT

Pollutant	Averaging Period	Conc. Units	Year										NAAQS	CAAQS
			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004		
Carbon monoxide (CO)	1-hour	ppm	9	10	9	8	7	10	6	6	6	4	*35*	*20*
	8-hour	ppm	6.6	6.9	6.7	6.6	5.4	5.8	4.7	4.6	4.7	3.4	*9*	*9.0*
Ozone (O_3)	1-hour	ppm	0.110	0.110	0.100	0.120	0.130	0.120	0.091	0.084	0.099	0.090	*(0.12)*[6]	*0.09*
	8-hour[5]	ppm	NA	0.074	0.066	0.065	0.068	0.069	0.060	0.060	0.063	0.071	*0.08*	*0.070*
Nitrogen dioxide (NO_2)	1-hour	ppm	0.21	0.17	0.20	0.16	0.15	0.14	0.13	0.13	0.14	0.12	*NA*	*0.25*
	Annual	ppm	0.0367	0.0342	0.0333	0.0339	0.0342	0.0313	0.0308	0.0298	0.0288	0.0280	*0.053*	*NA*
Sulfur dioxide (SO_2)	1-hour	ppm	0.14	0.04	0.04	0.08	0.05	0.05	0.05	0.03	0.03	0.04	*NA*	*0.25*
	3-hour[4]	ppm	0.14	0.04	0.04	0.08	0.05	0.05	0.05	0.03	0.03	0.04	*0.5*	*NA*
	24-hour	ppm	0.018	0.013	0.011	0.013	0.011	0.014	0.012	0.008	0.008	0.012	*0.04*	*0.14*
	Annual[2]	ppm	0.002	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.005	*0.03*	*NA*
Respirable Particulate Matter (PM_{10})	24-hour	$\mu g/m^3$	146	113	87	69	79	105	91	74	63	72	*150*	*50*
	Annual	$\mu g/m^3$	38.7	35.3	40.5	32.3	38.9	37.6	37.4	35.9	32.8	33.1	*50*	*20*
Fine Particulate Matter ($PM_{2.5}$)	24-hour[2,3]	$\mu g/m^3$	NA	NA	NA	NA	NA	NA	49.2	47.1	46.5	NA	*65*	*NA*
	Annual	$\mu g/m^3$	NA	NA	NA	NA	21.5	19.2	21.4	19.5	18.0	17.6	*15*	*12*
Lead (Pb)	Monthly	$\mu g/m^3$	0.05	0.08	0.05	0.07	0.06	0.05	0.05	0.03	0.10	0.02	*NA*	*1.5*
	Quarterly	$\mu g/m^3$	0.04	0.08	0.03	0.04	0.05	0.04	0.04	0.02	0.05	0.01	*1.5*	*NA*

Available at: http://www.aqmd.gov/smog/historicaldata.htm
1 Maximum concentration from 2002-2004 measurements are assumed to be representative of existing conditions in 2005.
2 Measurements obtained from the California Air Resources Board, available at: http://www.arb.ca.gov/adam/welcome.html.
3 24-Hour average $PM_{2.5}$ standard is based on the 98th percentile, per National Ambient Air Quality Standard (40 CFR 50.7).
4 SO2 3-hour concentration assumed to be equal to the measured SO2 1-hour concentration.
5 Reported ozone 8-hour average is the fourth highest value measured in each year.
6 The ozone 1-hour NAAQS was revoked on June 15, 2005.

CAAQS California Ambient Air Quality Standards
NAAQS National Ambient Air Quality Standards
NA not applicable
ppm parts per million by volume
µg/m3 micrograms per cubic meter

Source: SCAQMD Air Quality Data Tables for 2002, 2003, and 2004 (unless otherwise noted).

TABLE 3.2-5
10-YEAR AMBIENT AIR QUALITY TRENDS IN THE VICINITY OF LONG BEACH AIRPORT – DAYS ABOVE THE STANDARDS

Pollutant	Averaging Period	Standard	No. of Days Above the Federal or State Standards									
			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Carbon monoxide (CO)	1-hour	Federal	0	0	0	0	0	0	0	0	0	0
		State	0	0	0	0	0	0	0	0	0	0
	8-hour	Federal	0	0	0	0	0	0	0	0	0	0
		State	0	0	0	0	0	0	0	0	0	0
Ozone (O_3)	1-hour	Federal	0	0	0	0	1	0	0	0	0	0
		State	3	5	1	2	3	3	0	0	1	0
	8-hour	Federal	NA	NA	0	0	0	0	0	0	0	0
		State	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Nitrogen dioxide (NO_2)	1-hour	State	0	0	0	0	0	0	0	0	0	0
Sulfur dioxide (SO_2)	1-hour	State	0	0	0	0	0	0	0	0	0	0
	3-hour	Federal	0	0	0	0	0	0	0	0	0	0
	24-hour	Federal	0	0	0	0	0	0	0	0	0	0
		State	0	0	0	0	0	0	0	0	0	0
Respirable Particulate Matter (PM_{10})	24-hour[1]	Federal	0	0	0	0	0	0	0	0	0	0
		State	11 (18.6)	7 (14.6)	10 (17.5)	6 (10.2)	13 (22)	12 (21)	10 (17)	5 (8.6)	4 (6.6)	4 (6.7)
Fine Particulate Matter ($PM_{2.5}$)	24-hour[1]	Federal	NA	NA	NA	NA	1 (1)	4 (1.3)	1 (0.3)	0	3 (0.9)	1 (0.3)
Lead (Pb)	Monthly	State	0	0	0	0	0	0	0	0	0	0
	Quarterly	Federal	0	0	0	0	0	0	0	0	0	0

[1] Number of samples exceeding the standard, percent of samples presented in parentheses (%).
NA not applicable

Available at: http://www.aqmd.gov/smog/historicaldata.htm

Source: SCAQMD Air Quality Data Tables for 2002, 2003, and 2004 (unless otherwise noted).

TABLE 3.2-6
EXISTING AMBIENT AIR QUALITY IN THE VICINITY OF LONG BEACH AIRPORT AND AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Conc. Units	Measurement Year			Maximum (2005)[1]	NAAQS	CAAQS
			2002	2003	2004			
Carbon monoxide (CO)	1-hour	ppm	6	6	4	**6**	35	20
		$\mu g/m^3$	6870	6870	4580	**6,870**	40,000	23,000
	8-hour	ppm	4.6	4.7	3.4	**4.7**	9	9.0
		$\mu g/m^3$	5270	5380	3890	**5,380**	10,000	10,000
Ozone (O_3)	8-hour	ppm	0.06	0.063	0.071	**0.071**	0.09	0.070
		$\mu g/m^3$	118	124	139	**139**	180	137
Nitrogen dioxide (NO_2)	1-hour	ppm	0.13	0.14	0.12	**0.14**	NA	0.25
		$\mu g/m^3$	245	263	226	**263**	NA	470
	Annual	ppm	0.0298	0.0288	0.0280	**0.0298**	0.053	NA
		$\mu g/m^3$	56	54	53	**56**	100	NA
Sulfur dioxide (SO_2)	1-hour	ppm	0.03	0.03	0.04	**0.04**	NA	0.25
		$\mu g/m^3$	79	79	105	**105**	NA	655
	3-hour[4]	ppm	0.03	0.03	0.04	**0.04**	0.5	NA
		$\mu g/m^3$	79	79	105	**105**	1,300	NA
	24-hour	ppm	0.008	0.008	0.012	**0.012**	0.04	0.14
		$\mu g/m^3$	21	21	31	**31**	105	365
	Annual[2]	ppm	0.002	0.002	0.005	**0.005**	0.03	NA
		$\mu g/m^3$	5.2	5.2	13.1	**13.1**	80	NA
Respirable Particulate Matter (PM_{10})	24-hour	$\mu g/m^3$	74	63	72	**74**	150	50
	Annual	$\mu g/m^3$	35.9	32.8	33.1	**35.9**	50	20
Fine Particulate Matter ($PM_{2.5}$)	24-hour[2,3]	$\mu g/m^3$	47.1	46.5	NA	**47.1**	65	NA
	Annual	$\mu g/m^3$	19.5	18	17.6	**19.5**	15	12
Lead (Pb)	Monthly	$\mu g/m^3$	0.03	0.1	0.02	**0.10**	NA	1.5
	Quarterly	$\mu g/m^3$	0.02	0.05	0.01	**0.05**	1.5	NA

Notes:
1 Maximum concentration from 2002-2004 measurements are assumed to be representative of existing conditions in 2005.
2 Measurements obtained from the California Air Resources Board, available at: http://www.arb.ca.gov/adam/welcome.html.
3 24-Hour average $PM_{2.5}$ standard is based on the 98th percentile, per National Ambient Air Quality Standard (40 CFR 50.7).
4 SO2 3-hour concentration assumed to be equal to the measured SO2 1-hour concentration.

CAAQS California Ambient Air Quality Standards
NAAQS National Ambient Air Quality Standards
NA not applicable
ppm parts per million by volume
μg/m3 micrograms per cubic meter

Available at: http://www.aqmd.gov/smog/historicaldata.htm

Source: SCAQMD Air Quality Data Tables for 2002, 2003, and 2004 (unless otherwise noted).

In addition, the project vicinity cancer risk of 1,000 to 1,200 in one million was approximately 14 to 29 percent lower than the average cancer risk within the Basin as a whole, which was 1,400 per million. It should also be noted that, according to the EIR prepared for SCAG's 2004 Regional Comprehensive Plan and Guide, operations at Long Beach Airport are responsible for a minimal contribution to regional emissions. Table 3.2-7 illustrates this fact.

TABLE 3.2-7
LONG BEACH AIRPORT EMISSIONS COMPARED TO REGIONAL EMISSIONS

	VOC		CO		NO_X		SO_2		PM_{10}		$PM_{2.5}$	
	tpd	%[3]	tpd	%[3]	tpd	%[3]	tpd	%[3]	tpd	%[3]	tpd	%[3]
Total Anthropogenic in SoCAB[1]	718.31	100.00	4,100.19	100.00	975.30	100.00	58.48	100.00	291.95	100.00	112.49	100.00
Total Mobile (On-Road & Off-Road)[1]	421.91	58.74	3,891.10	94.90	877.70	89.99	39.42	67.41	39.99	13.70	31.42	27.93
Total Off-Road Mobile[1]	146.44	20.39	1,186.43	28.94	296.75	30.43	34.71	59.35	20.88	7.15	18.42	16.37
Total Aircraft[1]	5.47	0.76	50.79	1.24	26.53	2.72	0.95	1.62	0.65	0.22	0.65	0.58
Total Long Beach Airport[2]	0.12	0.02	4.32	0.11	0.57	0.06	0.04	0.06	0.04	0.01	0.03	0.02

1 From 2003 Air Quality Management Plan, Appendix III, Table A-6
2 Total Long Beach Airport emissions in 2005 include aircraft, GSE, ground access vehicles, and stationary sources.
3 Percent of Total Anthropogenic Emissions in SoCAB in 2005.
tpd = tons per day
SoCAB = South Coast Air Basin

Source: CDM 2005.

Existing Health Risk in the Surrounding Area

Based on the MATES II Study concentration data an emission inventories developed in 1998 to 1999, the project area was characterized by a health risk of approximately 1,000 to 1,200 in one million due to toxic air contaminants, approximately 14 to 29 percent lower than the average cancer risk within the Basin as a whole, which was 1,400 per million.. Approximately 90 percent of the measured risk from TACs at the Long Beach Monitoring Station is due to mobile combustion sources (e.g., cars, trucks, trains, ships, aircraft, etc.) associated with the Port of Long Beach, 1-405,1-710,1-605, SR-91, Alameda Corridor, and the Long Beach Airport. In addition, the project vicinity cancer risk of 1,000 to 1,200 in one million was approximately 14 to 29 percent lower than the average cancer risk within the Basin as a whole, which was 1,400 per million.

As shown in Table 3.2-8, like the criteria pollutant trends, TAC concentrations have declined since 1998, indicating that existing risks have also dropped. Based on the decline in several key TAC concentrations over the last seven to eight years (i.e., since the MATES II Study was published), existing cancer risk in the project vicinity may be 600 to 800 in one million near the Airport.

TABLE 3.2-8
TREND IN TAC CANCER RISK FROM 1998 TO 2004 IN THE VICINITY OF LONG BEACH AIRPORT

Toxic Air Contaminant	Conc. Units	Concentration[1]		Estimated Risk[2]		Change in Risk
		1998	2004	1998	2004	
Acetaldehyde	Ppb	1.43	1.19	7	6	-14%
Benzene	ppb	1.16	0.554	108	51	-53%
1,3-Butadiene	ppb	0.339	0.144	127	54	-57%
Carbon tetrachloride	ppb	0.118	0.092	31	24	-23%
Chloroform	ppb	0.040	0.039	1	1	0%
p-Dichlorobenzene	ppb	0.16	0.15	10	10	0%
cis-1,3-Dichloropropene	ppb	NA	0.05	NA	4	NA
trans-1,3-Dichloropropene	ppb	NA	0.05	NA	4	NA
Formaldehyde	ppb	3.68	2.78	27	20	-26%
Methylene chloride	ppb	0.60	0.24	2	0.8	-60%
Perchloroethylene	ppb	0.193	0.057	8	2	-75%
Trichloroethylene	ppb	0.025	0.022	0.3	0.2	-33%
Benzo(a)pyrene	ng/m^3	0.168	0.107	0.2	0.1	-50%
Benzo(b)fluoranthene	ng/m^3	0.190	0.116	0.02	0.01	-50%
Benzo(k)fluoranthene	ng/m^3	0.077	0.055	0.008	0.006	-25%
Dibenz(a,h)anthracene	ng/m^3	0.033	0.032	0.01	0.01	0%
Indeno(1,2,3-cd)pyrene	ng/m^3	0.286	0.136	0.03	0.01	-67%
Chromium – hexavalent	ng/m^3	0.11	0.09	16	14	-13%
Lead	ng/m^3	12.3	NA[3]	0.1	NA	NA
Nickel	ng/m^3	5.7	NA[3]	1	NA	NA
Estimated Risk Without Considering Diesel PM:				**339**	**193**	**-43%**
Estimated Risk Considering Diesel PM:[4]				**1130**	**643**	**-43%**

[1] Mean 1998 conc. presented if available - highest value between 1997 and 1999 used if not; mean 2004 conc. presented if available - highest value between 2002 and 2003 used if not.
[2] Risk values are incremental cancer risks per million population.
[3] Lead and nickel concentrations were last measured in Long Beach in 2001.
[4] Based on general MATES-II finding, diesel PM is assumed to contribute 70% to the total cancer risk.
NA not available or not applicable
ppb parts per billion by volume
ng/m3 nanograms per cubic meter
Source: CARB ADAM Toxics at http://www.arb.ca.gov/adam/toxics/sitepages/

<u>Existing Operational Emissions at the Airport</u>

Table 3.2-9 presents the total criteria air pollutant emission inventories for operations at the Airport based on existing conditions (2005). The effects of Airport operations on air quality in the vicinity of the Airport are represented in the data collected at the North Long Beach Monitoring Station.

TABLE 3.2-9
2005 EXISTING CONDITIONS CRITERIA POLLUTANT EMISSION INVENTORY

Source Type	Total Emissions, tons/yr					
	CO	VOC	NO_X	SO_2	PM_{10}[1]	$PM_{2.5}$[1]
Turbine Aircraft						
Idle	67.93	5.01	14.82	3.28	1.74	1.74
Approach	9.46	0.52	24.06	2.57	1.05	1.05
Climb Out	1.32	0.16	31.04	1.43	0.43	0.43
Takeoff	2.01	0.21	69.73	2.70	0.90	0.90
Turbine Aircraft Subtotal	80.72	5.90	139.65	9.98	4.12	4.12
Piston Aircraft Subtotal	1,314.56	18.80	3.30	0.14	2.30	1.74
All Aircraft Subtotal	1,395.28	24.70	142.95	10.11	6.42	5.86
APU Subtotal	4.45	0.34	9.39	1.02	0.85	0.85
Ground Service Equipment (GSE)						
CNG	10.68	0.00	3.79	0.00	0.02	0.02
Gasoline	96.18	6.64	19.76	0.29	0.09	0.09
Diesel	6.54	2.18	21.34	2.10	1.47	1.42
GSE Subtotal	113.40	8.83	44.89	2.39	1.58	1.53
Roadways						
Gasoline	36.26	3.89	3.91	0.03	0.19	0.17
Diesel	0.50	0.07	0.96	0.01	0.02	0.01
Fugitive	–	–	–	–	4.33	0.75
Roadway Subtotal	36.76	3.96	4.87	0.03	4.54	0.94
Parking						
Evaporative Losses	–	1.42	–	–	–	–
Exhaust	28.14	0.87	5.17	–	0.19	0.19
Parking Subtotal	28.14	2.30	5.17	–	0.19	0.19
Stationary Sources Subtotal	0.04	3.92	0.13	0.00	0.01	0.01
Grand Total	1,578.07	44.05	207.40	13.56	13.58	9.37

[1] PM emissions for aircraft calculated external to EDMS 4.3.

Source: CDM 2005.

Based on the US Department of Transportation's October 11, 2005 Air Travel Consumer Report, approximately 15 percent of the commercial aircraft that use Long Beach Airport arrive late and approximately 9 percent depart late. During peak periods each of the ten existing aircraft parking positions at the airport is in use. When flights arrive late during peak periods and no parking positions are available, the additional aircraft must wait on the tarmac until a parking position becomes available. While waiting, the aircraft remain in idle and, thus, emit pollutants for longer periods of time than usual. The impact analysis presented in Section 3.2.2 assumed that a total of 14 aircraft parking positions would be provided by the Proposed Project.

<u>Existing CO Concentrations at Roadway Intersections Near the Airport</u>

Table 3.2-10 presents maximum CO concentrations at roadway intersections near the Airport based on existing conditions (2005). It should be noted that the CO concentrations are traffic related; neither aircraft nor aircraft support equipment impact intersections.

TABLE 3.2-10
CURRENT MAXIMUM CO CONCENTRATIONS AT ROADWAY INTERSECTIONS IN THE VICINITY OF THE AIRPORT[1]

ID	Intersection	Traffic CO Conc. (ppm)		Max. Conc. (ppm)		Exceeds Threshold?	
		1-Hour	8-Hour	1-Hour[2]	8-Hour[3,4]	1-Hour[5]	8-Hour[6]
1	Carson Street/Cherry Avenue	3.7	2.6	9.7	7.3	no	no
2	Carson Street/Paramount Boulevard	3.5	2.5	9.5	7.2	no	no
3	Carson Street/Lakewood Boulevard	4.5	3.2	10.5	7.9	no	no
4	Carson Street/Clark Avenue	3.5	2.5	9.5	7.2	no	no
5	Bixby Road/Cherry Avenue	3.8	2.7	9.8	7.4	no	no
6	Conant Street/Lakewood Boulevard	2.8	2.0	8.8	6.7	no	no
7	Conant Street/Clark Avenue	1.9	1.3	7.9	6.0	no	no
8	East 36th Street/Cherry Avenue	4.5	3.2	10.5	7.9	no	no
9	East Wardlow Road/Cherry Avenue	5.1	3.6	11.1	8.3	no	no
10	East Wardlow Road/Dr. Douglas Road/ Lakewood Boulevard	3.6	2.5	9.6	7.2	no	no
11	East Wardlow Road/Clark Avenue	2.4	1.7	8.4	6.4	no	no
12	East Spring Street/Cherry Avenue	3.5	2.5	9.5	7.2	no	no
13	East Spring Street/Temple Avenue	4.7	3.3	10.7	8.0	no	no
14	East Spring Street/Redondo Avenue	4.5	3.2	10.5	7.9	no	no
15	East Spring Street/Lakewood Boulevard	4.4	3.1	10.4	7.8	no	no
16	East Spring Street/Clark Avenue	3.5	2.5	9.5	7.2	no	no
17	East Willow Street/Redondo Avenue	3.4	2.4	9.4	7.1	no	no
18	East Willow Street/Lakewood Boulevard	5.2	3.6	11.2	8.3	no	no
19	East Willow Street/Clark Avenue	3.6	2.5	9.6	7.2	no	no

[1] Receptors 3 meters from roadway
[2] Background (1-Hour) 6 ppm
[3] Background (8-Hour) 4.7 ppm
[4] Generalized Persistence Factor 0.7 (Urban Locations)
[5] Significance Threshold (1-Hour) 30.0 ppm
[6] Significance Threshold (8-Hour) 9.0 ppm

http://www.aqmd.gov/ceqa/handbook/signthres.doc

Source: SCAQMD Air Quality Significance Thresholds [Accessed August 31, 2005]; CDM, 2005.

<u>Related Planning Programs</u>

South Coast Air Quality Management Plan

The SCAQMD's *CEQA Handbook* states, "New or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." A Proposed Project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

(2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

SCAG Regional Transportation Plan

As previously stated, the 2004 RTP assumes that Long Beach Airport will accommodate 3.8 MAP and 137,000 tons of air cargo by 2030. The RTP does not contain any additional goals or policies relative to the Proposed Project.

Los Angeles County Congestion Management Plan

As discussed above and in Section 3.8, Traffic and Circulation, the Los Angeles County Congestion Management Plan seeks to link land use, transportation and air quality decisions. Goals and policies relative to the Proposed Project are discussed in Section 3.8, as is a discussion of the Proposed Project's consistency with those goals and policies.

City of Long Beach Strategic Plan 2010

<u>A Healthy Environment and Sustainable City</u>

Goal 4: Improve Air Quality

- Coordinate with other jurisdictions in the air basin to establish air quality plans and implementation programs, particularly with regards to interstate and international commerce (aircraft, ships, trains and diesel trucks).

City of Long Beach General Plan

<u>Air Quality Element</u>

The Air Quality Element is divided into seven topical areas: Government Organization, Roles and Responsibilities; Ground Transportation; Air Transportation; Land Use; Particulate Emissions; Energy Conservation; and Education. A general goal statement for each topic expresses the general, long-range condition toward which effort is being directed. Each goal is reinforced by a series of policies that provide guidance for decision-making that will advance that particular goal. Policies are then implemented through a number of actions. For the project, the following actions are applicable:

- Action 2.1.2.3 – Promote the creation of, and develop incentives for, sector committees consisting of local establishments providing consumer services and goods to offer and distribute those services and goods in a manner that will reduce overall automobile travel.

- Action 2.1.3.1 – Apply system management techniques specified in the City's Transportation Element, such as traffic signal synchronization or computerization, parking prohibitions, left-hand turn pockets, and recessed bus ways where appropriate to optimize existing capacity on regional corridors, and major and minor arterials.

- Action 2.1.3.6 – Invest in capital improvements intended to eliminate traffic bottlenecks, such as grade separations, street widening, intersection improvements, and new or realigned roadways.

- Action 2.4.1.3 – Ensure that all new development is designed and constructed to facilitate and encourage travel by carpool, vanpool, transit, bicycle, and foot.

- Action 2.4.1.10 – Ensure that pedestrian walkways are safe, convenient, and aesthetically appealing, especially at major activity centers.

- Action 5.2.2 – Improve the jobs/housing balance at the Southeast Los Angeles County Sub-regional level in relation to major activity centers as new development occurs.

- Action 6.1.8 – Once sources of particulate pollution have been identified, the City shall pursue potential mitigation measures through private/public collaborations, or through other available means.

- Action 7.1.4 – Encourage the incorporation of energy conservation features in the design of all new construction.

- Action 7.1.5 – Encourage the installation of conservation devices and low energy using/water consuming appliances in new and existing development.

City of Lakewood General Plan

Air Quality Element

The City of Lakewood Air Quality Element contains the following policies, which are applicable to the project:

- Policy 3.1 – Achieve a pattern of land uses that facilitates a reduction in mobile emissions through the availability of alternative transportation modes.

- Policy 4.1 – Reduce particulate emissions through regulations and enforceable measures to the extent possible. Sources of particulate emissions include unpaved roads, accumulated debris on paved roads, and dirt lots.

City of Signal Hill General Plan

Environmental Element

The City of Signal Hill has adopted a General Plan Environmental Element that includes Air Quality subtopics. Although Signal Hill does not have an explicit Air Quality element as with Long Beach and Lakewood, the Environmental Element contains a Los Angeles County Subregional Element that may have applicability to future projects in Signal Hill. Policy 5.1 of the Environmental Element also specifically addresses air quality in the City of Signal Hill. Air Quality topics in the General Plan include the following:

- Encourage new development to incorporate commercial and industrial uses near residential communities to reduce trips and trip lengths.

- Encourage several parking strategies, carpool and bus alternatives, the promotion of bicycle rack installation, and tree and shrub planting.

- Policy 5.1-Cooperate and participate in regional air quality management plans, programs and enforcement measures.

3.2.2 IMPACT ANALYSIS

<u>Thresholds of Significance</u>

For air quality impacts, CEQA significance thresholds for a project are determined by whether the project will result in one or more of the following:

1. Violate any ambient air quality standard;

2. Contribute substantially to an existing or projected air quality violation. For CO, an increase of ten percent or greater would be considered significant.

3. Expose sensitive receptors to substantial pollutant concentrations;

4. Result in an incremental (future alternative compared to 2005 Baseline) cancer risk greater than 10 in one million (1×10^5) or an incremental hazard greater than one for residents, school children, and off-airport workers;

5. Exceed occupational standards developed or adopted by Cal/OSHA for airport workers.

6. Conflict with or obstruct implementation of the applicable air quality plan;

Air pollutants have two general types of effects, regional and local. Regional effects are caused by those pollutants that have the capability of mixing with and adversely affecting the ambient air over a broad area within the air basin, not just within the project area. Pollutants that can have such effects include ROC and NO_X, which combine to form ozone, CO, PM_{10}, and SO_X. Significance thresholds are established for both emissions and concentrations of these pollutants in order to protect the overall ambient air quality of the entire air basin. Local effects are caused when pollutants that have the capability of reaching high concentrations in local areas ("hot spots") generate associated adverse effects. The primary pollutant that can have this effect is CO. Significance criteria are established for CO concentrations in order to protect local air quality. The specific significance criteria used in this EIR are listed in Table 3.2-11, below. They are intended to conform to the general criteria listed above.

TABLE 3.2-11
SCAQMD REGIONAL POLLUTANT EMISSION THRESHOLDS OF SIGNIFICANCE

	Pollutant Emissions (lbs/day)				
	CO	**ROG**	**NO_X**	**PM_{10}**	**SO_X**
Construction	550	75	100	150	150
Operation	550	55	55	150	150

Exceedance of the above thresholds is considered significant by the SCAQMD.

<u>Emission Standards for Pollutants with Localized Effects</u>

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. The relevant standards are listed below:

California State one-hour CO standard of 20.0 ppm
California State eight-hour CO standard of 9.0 ppm
Federal one-hour CO standard of 35.0 ppm
Federal eight-hour CO standard of 9.0 ppm

If an exceedance of the AAQS will result with or without the Proposed Project Scenarios, but the project will cause an increase in the exceedance, an increase in the concentrations of ten percent or greater is usually considered a significant adverse impact.

<u>Impact Analysis</u>

This section analyzes the impacts that could result from implementation of the Proposed Project as well as each of the project alternatives. Both construction-related impacts and project-related impacts are addressed. In addition, this section analyzes the impacts that could occur with "Optimized Flights" added to each alternative.

Threshold 1: ***The project would cause a significant impact if it would violate any ambient air quality standard.***

Threshold 2: ***The project would cause a significant impact if it would contribute substantially to an existing or projected air quality violation.***

<u>Construction Related Impacts</u>

Temporary air quality impacts would result from project construction activities. Air pollutants would be emitted by construction equipment and construction worker vehicles. Fugitive dust would be generated during demolition and construction activities in the terminal and parking areas. Appendix C provides detailed information on the assumptions and methodology used for assessing construction-related air quality impacts. Table 3.2-12, Project Construction Emissions Inventories, presents annual, peak, and daily emissions during construction. These estimates represent the highest potential level of construction-related emissions attributable to the Proposed Project. As shown in Table 3.2-12, on a peak construction day, the Proposed Project would exceed SCAQMD's thresholds of significance for NO_X and VOC. When combined in the presence of sunlight, VOCs react with NO_X to form ozone, a criteria pollutant for which the SoCAB is in non-attainment. Consequently, project-related construction activities would contribute to an existing air quality violation. It should be noted that these impacts would be short-term, occurring only during construction of the Proposed Project and would not result in the violation of any ambient air quality standard. Construction emissions for the other criteria pollutants (CO, PM_{10}, and $PM_{2.5}$) would be less than significant.

Impact 3.2-1 *Project-related construction activities would result in a significant short-term construction-related air quality impact for NO_X and VOC. Implementation of mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.*

TABLE 3.2-12
PROJECT CONSTRUCTION EMISSION INVENTORIES

Pollutant	Construction Emissions by Year								
	2006	2007	2008	2009	2010	2011			
Annual Emissions (tons/year)									
CO	3.8	10.9	8.0	6.3	5.7	5.6			
VOC	0.9	2.7	1.7	1.2	1.1	1.0			
NO_X	11.8	30.9	20.1	17.9	17.5	16.6			
SO_X	0.0	0.0	0.0	0.0	0.0	0.0			
$PM_{2.5}$	0.6	1.9	1.4	1.1	1.0	1.0			
PM_{10}	1.1	3.8	3.1	2.6	2.7	2.7			
Peak Quarterly Emissions (tons/quarter)							**Significance Threshold (tons/quarter)**		**Significant?**
CO	1.3	3.1	2.0	1.9	1.4	1.4	24.75		No
VOC	0.3	4.5	0.4	2.0	0.3	0.2	2.5		Yes
NO_X	3.7	8.6	5.1	4.8	4.4	4.2	2.5		Yes
SO_X	0.0	0.0	0.0	0.0	0.0	0.0	6.75		No
$PM_{2.5}$	0.2	0.5	0.3	0.3	0.3	0.2	NA		NA
PM_{10}	0.4	1.1	0.8	0.7	0.7	0.7	6.75		No
Daily Emissions (lbs/day) or Average Day in Peak Month							**Peak Day (lbs/day)**	**Significance Threshold (lbs/day)**	**Significant?**
CO	68	93	61	60	43	43	177	550	No
VOC	17	270	13	161	8	7	513	75	Yes
NO_X	217	260	154	150	134	128	494	100	Yes
SO_X	0	0	0	0	0	0	1	150	No
$PM_{2.5}$	12	17	10	10	8	8	31	NA	NA
PM_{10}	28	34	24	23	21	21	64	150	No

NA = not available

Source: CDM 2005.

<u>Project Related Impacts</u>

The Proposed Project would involve improvements to the existing Airport terminal as well as construction of a new parking structure to better serve existing demand at the Airport. The Proposed Project would not result in any additional flights or passengers; as a result, it would not alter the operating characteristics of the Airport. By providing sufficient parking at the Airport, the Proposed Project has the potential to have an incremental beneficial impact on air quality because there would be fewer trips compared to the No Project Alternative (see Section 3.8, Transportation and Circulation). Therefore, implementation of the Proposed Project would not result in any air quality impacts. No mitigation measures would be required.

<u>Additional Effects Related to Optimized Flights</u>

The primary sources of regional emissions generated under the Optimized Flights scenario would be ground service equipment and motor vehicles in the near-term (through 2011). However, the emissions from these sources are expected to diminish under new regulations being promulgated at the regional, state, and federal levels. Therefore, a slightly higher portion of future (2020) Airport emissions would be attributable to the 11 additional daily commercial flights that were analyzed under the Optimized Flights scenario. The Airport's incremental contribution to ambient concentrations of criteria pollutants under the Optimized Flights scenario is presented in Table 3.2-13, Future Air Quality in the Vicinity of Long Beach Airport with Optimized Flights, Operational Contributions.

As shown in Table 3.2-13, the concentrations of criteria pollutants resulting from future airport operations under the Optimized Flights scenario would not exceed State or federal ambient air quality standards for any of the criteria pollutants. However, the incremental concentrations of PM_{10} from future operations at the Airport would be in excess of SCAQMD's PM_{10} concentration threshold. Specifically, Airport operations would increase incremental future PM_{10} concentrations by 10.4 $\mu g/m^3$ in 2011 and 2020 – well above SCAQMD's 2.5 $\mu g/m^3$ significance threshold for PM_{10} (SCAQMD 1993).

In addition, operations under the Optimized Flights scenario would result in a cumulatively considerable net increase of PM_{10} – a criteria pollutant for which the region is in non-attainment. These PM_{10} impacts are primarily attributable to ground service equipment and cars and trucks operating in the Airport area. Because the region is in non-attainment for PM_{10} and the Airport's incremental contribution to future PM_{10} levels in the Airport vicinity would exceed SCAQMD's threshold of significance, operations under the Optimized Flights scenario would contribute substantially to an existing air quality violation. It is important to note that the parking structure and roadway improvements associated with the Proposed Project would actually result in lower incremental PM_{10} impacts than the No Project incremental PM_{10} impacts.

Particles in the air such as PM_{10} and $PM_{2.5}$ can cause or aggravate health problems and may be linked with heart or lung diseases. The health effects of exposure to PM_{10} range from minor effects, such as nose and throat irritation, to more serious effects such as aggravation of existing respiratory and cardiovascular disease. Fine particulate matter may bypass the body's defense mechanisms and become embedded in the deepest recesses of the lung, and can disrupt cellular processes. Consequently, the Optimized Flights scenario would result in significant impacts to sensitive receptors.

TABLE 3.2-13
FUTURE AMBIENT AIR QUALITY IN THE VICINITY OF LONG BEACH AIRPORT WITH OPTIMIZED FLIGHTS OPERATIONAL CONTRIBUTIONS

Pollutant	Averaging Period	Conc. Units	Existing AQ (2005)[1]	Incremental Airport Contribution Optimized Flights (Future - Existing)				Future Air Quality with Optimized Flights				NAAQS	CAAQS
				NP 2011	P 2011	NP 2020	P 2020	NP 2011	P 2011	NP 2020	P 2020		
Carbon monoxide (CO)[4]	1-hour	ppm	**6.0**	0.45	0.25	-1.90	-2.72	6.45	6.25	4.10	3.28	35	20
		$\mu g/m^3$	**6870**	5147	285	-2179	-3117	7384	7155	4691	3753	40,000	23,000
	8-hour	ppm	**4.7**	-0.21	-0.41	-1.88	-2.18	4.49	4.29	2.82	2.52	9	9.0
		$\mu g/m^3$	**5380**	-243	-472	-2156	-2491	5137	4908	3224	2889	10,000	10,000
Nitrogen dioxide (NO_2)	1-hour	ppm	**0.14**	0.0214	0.0177	0.0220	0.0232	0.16	0.16	0.16	0.16	NA	0.25
		$\mu g/m^3$	**263**	40	33	41	44	304	297	305	307	NA	470
	Annual	ppm	**0.030**	0.0067	0.0048	0.0029	0.0023	0.037	0.035	0.033	0.032	0.053	NA
		$\mu g/m^3$	**56**	13	9	6	4	69	65	62	60	100	NA
Respirable Particulate Matter (PM_{10})	24-hour	$\mu g/m^3$	**74.0**	10.1	10.4	14.3	10.4	**84.1**	**84.4**	**88.3**	**84.4**	150	50
	Annual	$\mu g/m^3$	**35.9**	9.2	7	9.4	6.8	**45.1**	**42.9**	**45.3**	**42.7**	50	20
Fine Particulate Matter ($PM_{2.5}$)	24-hour[2,3]	$\mu g/m^3$	**47.1**	1.6	1.9	2.6	1.7	48.7	49.0	49.7	48.8	65	NA
	Annual	$\mu g/m^3$	**19.5**	1.9	1.2	1.7	1.1	**21.4**	**20.7**	**21.2**	**20.6**	15	12
Lead (Pb)	Monthly	$\mu g/m^3$	**0.10**	0.0009	0	0.41	0.0009	**0.10**	**0.10**	**0.51**	**0.10**	na	1.5
	Quarterly	$\mu g/m^3$	**0.05**	0	0	0	0	**0.05**	**0.05**	**0.05**	**0.05**	1.5	na

1 Maximum concentration from 2002-2004 measurements are assumed to be representative of existing conditions in 2005.
2 Measurements obtained from the California Air Resources Board, available at: http://www.arb.ca.gov/adam/welcome.html.
3 24-Hour average $PM_{2.5}$ standard is based on the 98th percentile, per National Ambient Air Quality Standard (40 CFR 50.7).
4 CO concentrations include sum of airport operations and roadway intersections.

CAAQS = California Ambient Air Quality Standards
NAAQS = National Ambient Air Quality Standards
NA = not applicable
NP = 41 commercial + 25 commuter flights + 11 optimized flights
P = 41commercial + 25 commuter + 11 optimized flights, with terminal improvements
ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter

Sources: SCAQMD Air Quality Data Tables for 2002, 2003, and 2004 (unless otherwise noted).Available at: http://www.aqmd.gov/smog/historicaldata.htm CDM 2005.

Impact 3.2-2	*Incremental air quality emissions with the Optimized Flights would exceed SCAQMD's PM_{10} concentration threshold due to associated GSE and vehicular traffic activity, contribute substantially to an existing air quality violation, and expose sensitive receptors to significant PM_{10} concentrations. Implementation of the mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.*

As illustrated in Table 3.2-14, the incremental emissions resulting from Airport operations under the Optimized Flights scenario would exceed SCAQMD thresholds of significance for CO and NO_X in 2011 and 2020. This would be considered a significant impact of operations under the Optimized Flights scenario.

TABLE 3.2-14
INCREMENTAL[1] OPERATIONAL EMISSIONS WITH OPTIMIZED FLIGHTS COMPARED TO SIGNIFICANCE THRESHOLDS

Year and Alternative	**Incremental Emissions**					
	CO	**VOC**	**NO_X**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Operational Significance Thresholds, lb/day[(2)]	550	55	55	150	150	NA
2011 Incremental Emissions, tpy	178.39	1.92	94.09	9.82	5.96	2.65
2011 Incremental Emissions, lb/day	977	11	516	54	33	15
Above Thresholds? (yes/no)	**Yes**	**No**	**Yes**	No	No	NA
2011 No Project Incremental Emissions, tpy	188.49	2.97	94.96	9.83	8.05	3.08
2011 No Project Incremental Emissions, lb/day	1,033	16	520	54	44	17
Above Thresholds? (yes/no)	**Yes**	**No**	**Yes**	No	No	NA
2020 Incremental Emissions, tpy	101.08	(4.08)	77.46	9.82	5.63	2.33
2020 Incremental Emissions, lb/day	554	(22)	424	54	31	13
Above Thresholds? (yes/no)	**Yes**	No	**Yes**	No	No	NA
2020 No Project Incremental Emissions, tpy	105.88	(3.49)	77.70	9.83	7.71	2.76
2020 No Project Incremental Emissions, lb/day	580	(19)	426	54	42	15
Above Thresholds? (yes/no)	**Yes**	No	**Yes**	No	No	NA

1 Incremental emissions are those above the 2005 Existing Conditions emissions.
2 Operational Significance Thresholds from SCAQMD CEQA Handbook (SCAQMD 1993).
NA = Not available or not applicable.

Source: CDM 2005.

Impact 3.2-3	*Air quality emissions with the Optimized Flights would exceed SCAQMD's thresholds of significance for CO and NO_X. The mitigation program presented in Section 3.2.3 would reduce the CO impacts to a level considered less than significant. NO_X emissions would remain significant even after implementation of the mitigation program.*

As previously stated, aircraft that arrive late during peak periods at the Airport remain in idle until a parking position becomes available and, thus, emit pollutants for longer periods of time than usual. The air quality analysis upon which these findings are based assumed four additional parking positions would be added at the Airport, for a total of 14. If fewer parking positions were created, additional emissions impacts would occur under the Optimized Flights scenario due to increased aircraft idling.

Threshold 3: ***The project would cause a significant impact if it would expose receptors to substantial pollutant concentrations.***

Threshold 4: ***The project would cause a significant impact if it would result in an incremental (future alternative compared to 2005 Baseline) cancer risk greater than 10 in one million (1 x 10-5) or a hazard greater than one for residents, school children, and off-airport workers.***

The Airport is surrounded by commercial areas on the west, north, and south with a golf course located to the east. Residential areas are located somewhat farther away in these directions although residential areas are directly across the street from the southeast corner of the Airport. Douglas Park, a new mixed-use development, is planned to the north of the Airport. Over 80 schools were identified within the study area. The nearest downwind school is George Washington Carver School (Elementary) located at 5335 East Pavo Street about one third mile east of the airport.

Construction Related Impacts

Construction of the Proposed Project would not result in increased cancer risk because exposure to carcinogens is cumulative throughout a person's life (estimated at 70 years) and exposure to short-term construction activities would not, therefore, be expected to result in increased cancer risks.

Exposure to non-carcinogens during construction activities would also not result in unacceptable acute hazards. The acute HIs are summarized on Table 3.2-15. Note that these HIs are calculated from maximum concentrations regardless of location. Thus, exposure to all of these TACs at their maximum concentrations in one location is theoretical. In addition, most, or all, receptors will either move around the Airport or be located in an area removed from the point of highest exposure. Thus, all or virtually all receptors would experience lower airborne concentration of TACs than those reported on Table 3.2-15. The analysis thus suggests little potential for unacceptable acute expose from construction activities.

No significant impacts would occur from short-term construction activities, and no mitigation would be required.

Project Related Impacts

As previously discussed, the Proposed Project would not result in any additional flights or passengers. Therefore, implementation of the Proposed Project would not result in any air quality impacts beyond those discussed as construction-related impacts. No mitigation measures would be required.

TABLE 3.2-15
TACS OF CONCERN FOR ACUTE EXPOSURE DURING CONSTRUCTION

TAC	Estimated 1-Hour Maximum Incremental Concentrations during Construction (ug/m^3)	Acute REL (ug/m^3)	Acute Hazard Index
Formaldehyde	7.5	94	0.08
Benzene	1.0	1,300	0.0008
Methyl Ethyl Ketone	0.76	13,000	0.00006
Toluene	0.75	37,000	0.00004
Xylenes Total	0.53	22,000	0.00007
Styrene	0.030	21,000	0.00007
Methyl Alcohol	0.015	28,000	0.0006
Isopropyl Alcohol	0.33	3,200	0.0001
Triethylamine	0.29	2,800	0.0001
Ammonia	0.22	3,200	0.00007
Arsenic	0.0039	0.19	0.02
Chlorine	0.67	210	0.003
Copper	0.022	100	0.0002
Mercury	0.0044	1.8	0.002
Nickel	0.012	6	0.002
Source: CDM 2005.			

<u>Additional Effects Related to Optimized Flights</u>

As illustrated in Table 3.2-16, all estimated incremental cancer inhalation risks for residents, school children, and off-Airport workers would be less than the cancer risk significance threshold of 10 in one million under the Optimized Flights scenario. Similarly, as shown in Table 3.2-17, Summary of Project Multi-Pathway Incremental Cancer Risks for Adult Resident, risks associated with exposure to TACs by pathways other than inhalation would not contribute significantly to total risk. No significant impacts would occur. No mitigation would be required.

TABLE 3.2-16
ESTIMATED HIGHEST INCREMENTAL CANCER INHALATION RISKS

Alternative	Cancer Inhalation Risks (per million individuals)				
	Resident			School Child	Off-Airport Worker
	Adult	Child	Adult + Child[1]		
2011 No Project	0.5	0.1	0.5	-0.0007	1.1
2011 Optimized Flights	1.8	0.4	1.8	0.0003	2.6
2020 No Project	2.0	0.5	2.1	0.003	1.7
2020 Optimized Flights	-0.2	-0.07	-0.3	-0.004	0.8

[1] This residential receptor represents the combination of an adult resident with a 61-year exposure duration and a child resident with a 9-year exposure duration.

Source: CDM 2005.

TABLE 3.2-17
SUMMARY OF PROJECT MULTI-PATHWAY INCREMENTAL CANCER RISKS FOR ADULT RESIDENT[1]

	Cancer Risk (per million individuals)				
	Cancer Multi-Pathway Adjustment Factor (MP r)	**Peak Inhalation 2011 Optimized Flights[2]**	**Multi-Pathway 2011 Optimized Flights[2]**	**Peak Inhalation 2020 Optimized Flights[2]**	**Multi-Pathway Optimized Flights[2]**
SVOCs					
PAHs	29.76	0.000044	0.0013	0.000002	0.000055
Dibenzo(a,h)anthracene	10.26	0.000029	0.00030	0.000001	0.000013
Inorganics					
Lead	4.19	-0.00039	-0.0017	-0.0000053	-0.000022

1 Adult, 70 year exposure duration
2 Location of maximum inhalation risk

Source: CDM 2005.

It should be noted that the 2020 scenarios have lower incremental cancer risks than the 2011 scenarios because the phase-in of regulations that apply to both on-road (passenger cars and cargo trucks) and off-road mobile sources (GSE) will result in a decrease of emissions. In addition, the fleet mix (cars, trucks and GSE) analyzed for each year assumes some fleet turnover that incorporates newer technologies that are implemented to comply with the regulations.

As the primary source of airport emissions shifts from GSE and on-road emissions (in 2011) to aircraft (in 2020), the peak impact locations generally move south due to Runway 30 (in the southeast part of the airfield) being the primary takeoff runway. By assuming that almost all jet aircraft taxi to and takeoff from this location, the peak impact locations move southward. (Although aircraft occasionally takeoff from Runway 12 on the opposite end, this occurs less than 10 percent of the time.)

The incremental cancer risks for 2020 Proposed Project are lower than for 2020 No Project indicating fewer impacts for this scenario than for 2020 No Project. In fact, the residential incremental risks indicate a minor beneficial impact for the 2020 Proposed Project. These results reflect the improved traffic circulation and parking conditions under the Proposed Project compared to No Project conditions in 2020.

As discussed in the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C) and illustrated in Table 3.2-18, Estimated Highest Incremental Non-Cancer Inhalation Health Hazard Indices (HI), implementation of the Optimized Flights scenario would not be expected to result in significant chronic non-cancer effects. HI estimates include cumulative exposures to all TACs that are toxic to the respiratory system at low chronic daily exposure. As shown in Table 3.2-18, all incremental chronic non-cancer HIs are less that the significance threshold of 1. No impacts would occur. No mitigation would be required.

TABLE 3.2-18
ESTIMATED HIGHEST INCREMENTAL CHRONIC NON-CANCER INHALATION HEALTH HAZARDS

Alternative	Chronic Non-cancer Inhalation Health Hazard Indices			
	Resident		School Child	Off-Airport Worker
	Adult	Child[1]		
2011 No Project	0.01	0.01	0.0005	0.05
2011 Optimized Flights	0.007	0.01	0.0007	0.02
2020 No Project	-0.0003	-0.0007	-0.00006	-0.00008
2020 Optimized Flights	0.0002	0.0003	-0.00004	0.004

Threshold of significance > 1.
[1] The child resident has a 9-year exposure duration.

Source: CDM 2005.

As discussed in the *Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport* (refer to Appendix C), Cal EPA's OEHHA has developed an acute reference exposure level (REL) for acrolein, and several other TACs of concern in emissions from the Airport. The 1-hour estimate maximum concentration estimates prepared for the analysis of airport operations under the Optimized Flights scenario showed that the ratios for all chemicals except acrolein were so small that they would have no impact on assessment of acute risks.

Acrolein is a TAC of concern and has been shown in analyses of non-cancer hazards at other airports to be associated with airport operations. As illustrated in Table 3.2-19, maximum 1-hour concentrations of acrolein resulting from airport operations under the Optimized Flights scenario would be less than the significance threshold of 1. No impacts would occur. No mitigation would be required.

TABLE 3.2-19
MAXIMUM ACUTE HAZARD INDEX FOR ACROLEIN

Alternative	Maximum Acute Hazard Index for Acrolein			
	Resident		School Child	Off-Airport Worker
	Adult	Child		
2011 No Project	0.59	0.14	0.59	0.84
2011 Optimized Flights	0.23	0.23	0.20	0.44
2020 No Project	0.35	0.35	0.16	0.43
2020 Optimized Flights	0.36	0.36	0.16	0.44

Threshold of significance > 1.

Source: CDM 2005.

Threshold 5: ***The project would cause a significant impact if it would exceed occupational standards developed or adopted by Cal/OSHA for airport workers.***

On-Airport outdoor workers are located close to the major sources of emissions. These workers are expected to receive the highest exposures to TACs because a large percentage of aircraft idle and taxi times are spent at or near terminal gates, and because ground service equipment is concentrated near the gates. Aircraft and GSE account for almost all TAC releases at the

Airport. The HHRA, therefore, included an assessment of possible impacts to on-Airport workers.

<u>Construction Related Impacts</u>

As discussed in Section 3.4, Hazards and Hazardous Materials, asbestos containing materials and lead-based paint could be induced into the environment during construction. Airport workers could, therefore, be exposed to asbestos and lead-based paint emissions during construction of the Proposed Project. Implementation of the mitigation program presented in Section 3.4 would reduce these impacts to a level considered less than significant.

During construction of the Proposed Project, airport workers could also be exposed to NO_X emissions generated by construction equipment and VOC emissions from paint. As previously discussed, Nitrogen Dioxide (NO_2) is a portion of NO_X emissions. NO_2 can irritate the nose throat, and lungs, especially in people with asthma. It also lowers resistance to respiratory infection. VOCs contribute to the formation of smog and/or may themselves be toxic.

These short-term exposures would not be expected to exceed occupational standards developed or adopted by Cal/OSHA for airport workers. No impact would occur. No mitigation would be required.

<u>Project Related Impacts</u>

As previously stated, the Proposed Project would not result in any additional flights or passenger levels or change operational procedures. Therefore, implementation of the Proposed Project would not result in any air quality impacts beyond those related to construction activities. No mitigation measures would be required.

<u>Additional Effects Related to Optimized Flights</u>

Table 3.2-20 provides a comparison between Cal/OSHA Permissible Exposure Limits (PEL-TWA) and the maximum estimated 8-Hour on-Airport air concentrations for the 2011 Optimized Flights scenario. Estimated 8-hour maximum concentrations for the 2011 Optimized Flights scenario are all less than associated PEL-TWAs by two orders of magnitude or more. In addition, most, or all, on-Airport workers will either move around the Airport or be located in an area removed from the point of highest exposure. Thus, all or virtually all on-Airport workers would experience lower air-borne concentrations of TACs than those shown in Table 3.2-20. This finding suggests that even at locations where workers might be exposed to the highest concentrations, no exceedances of workplace standards would be expected. No impacts would occur. No mitigation would be required.

TABLE 3.2-20
COMPARISON OF CAL/OSHA PERMISSIBLE EXPOSURE LIMITS (PEL-TWA) TO MAXIMUM ESTIMATED 8-HOUR ON-AIRPORT CONCENTRATIONS FOR 2011 OPTIMIZED FLIGHTS CONDITIONS

TAC	2011 Optimized Flights Maximum 8-hour Concentration (mg/m^3)	Cal/OSHA PEL-TWA (mg/m^3)[1]	RATIO[2]
Major Contributors			
Diesel Particulate Matter	0.002	5	0.0004
Acrolein	0.00003	0.25	0.0001
Formaldehyde	0.0007	0.94	0.0008
1,3-Butadiene	0.00008	2.20	0.00004
Benzene	0.0004	3.25	0.0001
Chromium VI	0.0000008	0.01	0.00008
Acetaldehyde	0.00009	45	0.000002
Lead	0.00002	0.05	0.0004
Manganese	0.0001	0.20	0.0007
Minor Contributors			
Cobalt	0.000004	0.02	0.0002
Naphthalene	0.00002	50	0.0000003
Toluene	0.0006	188	0.0000003
Xylene, total	0.0006	435	0.000001
Titanium	0.0009	NA	NA
Iron	0.01	1	0.01
Ethylbenzene	0.001	435	0.0000003
Nickel	0.000004	1	0.000004
Styrene	0.00003	215	0.0000001
Phenol	0.00002	19	0.000001
PAHs[3]	0.000000007	0.20	0.00000004
Dibenzo(a,h)anthracene	0.000000005	NA	NA
Barium	0.0003	0.50	0.0006
Copper	0.00005	1	0.00005
Zinc	0.0002	5	0.00004
Strontium	0.00006	NA	NA
Tin	0.00002	0.10	0.0002
Zirconium	0.00002	5	0.000004
Sulfur	0.0006	NA	NA
Scandium	0.0000002	NA	NA
Calcium	0.006	NA	NA

Notes:
1 PEL-TWA for benzene and formaldehyde have been converted from PEL concentrations in ppmv. The PEL listed for zinc is for zinc oxide fume. The PEL listed for PAHs is for coal tar pitch volatiles. The PEL listed for diesel particulate matter is the PEL for particulates not otherwise regulated - respirable fraction.
2 The concentrations for Project in this table are presented in mg/m^3 to correspond with the common units for PEL-TWAs although in the rest of this analysis project concentrations are shown in mg/m^3. PEL-TWAs are presented as mg/m^3 because these are the common units for these standards.
3 PAHs include benzo (a) pyrene, indeno (1,2,3-cd) pyrene, benzo (b) fluoranthene, benzo (k) fluoranthene, benzo (a) anthracene, and chrysene.

Source: CDM 2005.

Threshold 6: The project would cause a significant impact if it would conflict with or obstruct implementation of the applicable air quality plan.

An EIR must discuss the consistency between the Proposed Project and applicable General Plans and regional plans. As discussed above, plans that apply to the Proposed Project include the City of Long Beach Strategic Plan 2010, the City of Long Beach General Plan Air Quality Element, SCAG's Regional Transportation Plan, the Los Angeles County Congestion Management Plan, and the South Coast Air Quality Management Plan.

Table 3.2-21, Consistency of the Proposed Project with Air Quality Related Goals and Policies, addresses the consistency of the Proposed Project with the relevant goals and policies. As identified in Table 3.2-21 the Proposed Project would be considered generally consistent with the relevant goals and policies related to air quality. However, the Optimized Flights scenarios have other limited inconsistencies.

TABLE 3.2-21
CONSISTENCY OF THE PROPOSED PROJECT WITH AIR QUALITY RELATED GOALS AND POLICIES

GOALS AND POLICIES	CONSISTENCY ANALYSIS
South Coast Air Quality Management Plan	
• Criterion 1: Increase in the Frequency or Severity of Violations	Based on the air quality modeling analysis contained in the Air Quality Impact Analysis and Human Health Risk Assessment for the Long Beach Airport, there would be significant short-term construction and long-term operational impacts due to the project based on the SCAQMD thresholds of significance. Specifically, construction of the Proposed Project would result in short-term significant, unavoidable NO_X emissions. Likewise, operations under the Optimized Flights scenario would contribute to the exceedance of PM_{10} concentration standards. Implementation of the mitigation measures presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant. Consequently, the Optimized Flights scenario would be consistent with the AQMP for the first criterion.
• Criterion 2: Exceed assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.	As discussed above, construction of the Proposed Project would exceed SCAQMD's significance threshold for NO_X emissions and operations under the Optimized Flights scenario would exceed SCAQMD's threshold for PM_{10} emissions. It is not possible to accurately predict whether these activities would exceed assumptions of the AQMP in 2010 or future years because compliance with the assumptions is dependant on so many factors external to the Proposed Project (e.g., the basin's progress in reducing emissions from other sources at the local and regional levels, weather conditions). However, because construction of the Proposed Project and operations under the Optimized Flights scenario would result in exceedances of SCAQMD thresholds, it could be concluded that the Proposed Project would not be consistent with the second criterion (identified as Impact 3.2-2).

TABLE 3.2-21 (Continued)
CONSISTENCY OF THE PROPOSED PROJECT WITH AIR QUALITY RELATED GOALS AND POLICIES

GOALS AND POLICIES	CONSISTENCY ANALYSIS
SCAG Regional Transportation Plan	
Long Beach Airport will accommodate 3.8 million annual passengers (MAP) and 137,000 tons of air cargo by 2030.	The Proposed Project would involve improvements to the existing Airport terminal as well as construction of a new parking structure to better serve existing demand at the Airport. Consequently, the Proposed Project would neither limit nor allow increased operations at the Airport. Therefore, it would not conflict with the goals included in SCAG's Regional Transportation Plan.
Los Angeles County Congestion Management Program	
Local jurisdictions have the lead authority for determining the level of mitigation required and for ensuring that mitigation measures are reasonably related to the impact. Within that context, the EIR process provides local jurisdictions with the opportunity to incorporate traffic mitigation measures that are multi-modal, and that encourage the use of alternative transportation modes.	As stated above, the Proposed Project would include improvements to eliminate potential bottlenecks on Lakewood Boulevard, a major arterial and regional corridor. The proposed improvements would not result in any impacts to existing transit service at the Airport. Therefore, the Proposed Project would be consistent with the Los Angeles County Congestion Management Program.
City of Long Beach Strategic Plan 2010	
A Healthy Environment and Sustainable City Goal 4: Improve Air Quality • Coordinate with other jurisdictions in the air basin to establish air quality plans and implementation programs, particularly with regards to interstate and international commerce (aircraft, ships, trains and diesel trucks).	The improvements being proposed for the Long Beach Airport are consistent with the 2004 Regional Transportation Plan, which was developed in coordination with jurisdictions throughout the SoCAB. The Regional Transportation Plan is one of the elements that form the basis of the South Coast Air Quality Management Plan. The Proposed Project is, therefore, consistent with the goals of the City's Strategic Plan 2010.
City of Long Beach General Plan Air Quality Element	
• Action 2.1.2.3–Promote the creation of, and develop incentives for, sector committees consisting of local establishments providing consumer services and goods to offer and distribute those services and goods in a manner that will reduce overall automobile travel.	The Proposed Project would increase concession space at the Airport, thereby reducing the need for Airport patrons and workers to travel off site for food and convenience items.
• Action 2.1.3.1–Apply system management techniques specified in the City's Transportation Element, such as traffic signal synchronization or computerization, parking prohibitions, left-hand turn pockets, and recessed bus ways where appropriate to optimize existing capacity on regional corridors, and major and minor arterials.	All the streets in the airport area have their traffic signals synchronized. Any new traffic work done as part of the Proposed Project would be tied into this system by the City's traffic crews.

TABLE 3.2-21 (Continued)
CONSISTENCY OF THE PROPOSED PROJECT WITH AIR QUALITY RELATED GOALS AND POLICIES

GOALS AND POLICIES	CONSISTENCY ANALYSIS
• Action 2.1.3.6–Invest in capital improvements intended to eliminate traffic bottlenecks, such as grade separations, street widening, intersection improvements, and new or realigned roadways.	The Proposed Project would include the extension of the south side of the Donald Douglas Drive loop to exit onto Lakewood Boulevard, with southbound Lakewood Boulevard access only (right turn only). These improvements would eliminate potential bottlenecks on Lakewood Boulevard, a major arterial and regional corridor.
• Action 2.4.1.3–Ensure that all new development is designed and constructed to facilitate and encourage travel by carpool, vanpool, transit, bicycle, and foot.	Long Beach Airport is currently served by one Long Beach Transit route, which provides easy connection and transfers to major locations in the Los Angeles and Orange Counties. During weekdays this route starts operation at about 5 AM in the morning and runs until 12:30 AM, with headways of about 30 minutes until 6:30 PM and a 60-minute headway thereafter. During weekends and holidays the route operates from about 5:40 AM to 12:30 AM, with headways of about 60 minutes. The Proposed Project would not result in any impacts to this service.
• Action 2.4.1.10–Ensure that pedestrian walkways are safe, convenient, and aesthetically appealing, especially at major activity centers.	The Proposed Project would implement improvements to the Airport's internal pedestrian walkways, to enhance safety and convenience as well as increase aesthetic appeal.
• Action 5.2.2–Improve the jobs/housing balance at the Southeast Los Angeles County Sub-regional level in relation to major activity centers as new development occurs.	The Proposed Project would not result in any impacts to jobs/housing balance in the Southeast Los Angeles County subregion. However, the additional flights that could occur under the Optimized Flights scenario (independent of the Proposed Project) could produce result in new job opportunities at the Airport.
• Action 6.1.8–Once sources of particulate pollution have been identified, the City shall pursue potential mitigation measures through private/public collaborations, or through other available means. • Action 7.1.5–Encourage the installation of conservation devices and low energy using/water consuming appliances in new and existing development.	The mitigation program presented in Section 3.2.3 includes several mitigation measures that would reduce particulate pollution in the Airport vicinity.
City of Lakewood General Plan Air Quality Element	
• Policy 3.1-Achieve a pattern of land uses that facilitates a reduction in mobile emissions through the availability of alternative transportation modes.	As previously stated, the Proposed Project would not result in any impacts to existing transit service at the Airport. Therefore, it would support alternative transportation modes.
• Policy 4.1-Reduce particulate emissions through regulations and enforceable measures to the extent possible. Sources of particulate emissions include unpaved roads, accumulated debris on paved roads, and dirt lots.	Implementation of the mitigation measures included in Section 3.2.3 would reduce particulate emissions to the maximum extent feasible. The Proposed Project would be consistent with the policies of the Lakewood General Plan Air Quality Element.

TABLE 3.2-21 (Continued)
CONSISTENCY OF THE PROPOSED PROJECT WITH AIR QUALITY RELATED GOALS AND POLICIES

GOALS AND POLICIES	CONSISTENCY ANALYSIS
City of Signal Hill General Plan Environmental Element	
• Encourage new development to incorporate commercial and industrial uses near residential communities to reduce trips and trip lengths. • Encourage several parking strategies, carpool and bus alternatives, the promotion of bicycle rack installation, and tree and shrub planting. Policy 5.1-Cooperate and participate in regional air quality management plans, programs and enforcement measures.	The Proposed Project would occur entirely within the City of Long Beach and would not, therefore, impact land uses in Signal Hill. The Proposed Project would be consistent with the air quality-related policies of the Signal Hill General Plan.

Alternative A (2003 NOP)

<u>Construction Related Impacts</u>

Construction of Alternative A would result in the same impacts as construction of the Proposed Project. These impacts are summarized below.

On a peak construction day, the Alternative A would exceed the thresholds of significance for NO_X and VOC. These would be considered significant short-term impacts of Alternative A. Construction emissions for the other criteria pollutants (CO, PM_{10}, and $PM_{2.5}$) would be less than significant.

Alternative A would be consistent with all applicable local and regional plans, programs and policies except the South Coast AQMP. As discussed above, implementation of Alternative A would result in emissions of NO_X that exceed SCAQMD thresholds.

During construction of Alternative A, sensitive receptors could be exposed to significant NO_X emissions. Nitrogen Dioxide (NO_2) is a portion of NO_X emissions. NO_2 can irritate the nose throat, and lungs, especially in people with asthma. It also lowers resistance to respiratory infection. VOCs contribute to the formation of smog and/or may be toxic. Implementation of the mitigation measures presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant. Therefore, construction of Alternative A could result in short-term significant impacts to sensitive receptors near the Airport.

As discussed in Section 3.4, Hazards and Hazardous Materials, asbestos containing materials and lead-based paint could be induced into the environment during construction. Airport workers could, therefore, be exposed to asbestos and lead-based paint emissions during construction of the Alternative A. Implementation of the mitigation program presented in Section 3.4 would reduce these impacts to a level considered less than significant.

During construction of the Alternative A, airport workers could also be exposed to NO_X emissions generated by construction equipment. As previously discussed, NO_2 is a portion of NO_X emissions. NO_2 can irritate the nose throat, and lungs, especially in people with asthma. It also lowers resistance to respiratory infection.

These short-term exposures would not be expected to directly result in increased cancer risk because exposure to carcinogens is cumulative throughout a person's life. No impact would occur. No mitigation would be required.

Project Related Impacts

As with the Proposed Project, Alternative A would not result in any additional flights or passenger levels or change operational procedures. Therefore, implementation of Alternative A would not result in any air quality impacts beyond those related to construction activities. No mitigation measures would be required.

Additional Impacts Related to Optimized Flights

Operations under the Alternative A Optimized Flights scenario would result in the same impacts as operations under the Proposed Project Optimized Flights scenario. These impacts are summarized below.

As with the Proposed Project, incremental air quality emissions under the Alternative A Optimized Flights scenario would exceed SCAQMD's PM_{10} concentration threshold due to associated GSE and vehicular traffic activity, thereby contributing substantially to an existing air quality violation and exposing sensitive receptors to significant PM_{10} concentrations. The mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.

Operations under the Alternative A Optimized Flights scenario would also exceed SCAQMD's thresholds of significance for CO, VOC and NO_X. The mitigation program presented in Section 3.2.3 would reduce CO and VOC impacts to a level considered less than significant; however, NO_X emissions would remain significant.

Operations under the Alternative A Optimized Flights scenario would be consistent with all applicable local and regional plans, programs and policies except the South Coast AQMP. As with the Proposed Project, implementation of the Alternative A Optimized Flights scenario would result in emissions of PM_{10} that exceed SCAQMD thresholds.

Under the Alternative A Optimized Flights scenario, all estimated incremental cancer inhalation risks for residents, school children, and off-Airport workers would be less than the cancer risk significance threshold of 10 in one million under the Alternative A Optimized Flights scenario. Similarly, risks associated with exposure to TACs by pathways other than inhalation would not contribute significantly to total risk. No impacts would occur. No mitigation would be required.

Estimated 8-hour maximum concentrations for the 2011 Alternative A Optimized Flights scenario would be less than associated PEL-TWAs by two orders of magnitude or more. In addition, most, or all, on-Airport workers would either move around the Airport or be located in an area removed from the point of highest exposure. Even at locations where airport workers might be exposed to the highest concentrations, no exceedances of workplace standards would be expected. No impacts would occur. No mitigation would be required.

Alternative B (Reduced Facilities)

Construction Related Impacts

Construction of Alternative B would result in the same impacts as construction of the Proposed Project. These impacts are summarized below.

On a peak construction day, the Alternative B would exceed the thresholds of significance for NO_X and VOC. These would be considered significant short-term impacts of Alternative B. Construction emissions for the other criteria pollutants (CO, PM_{10}, and $PM_{2.5}$) would be less than significant.

Alternative B would be consistent with all applicable local and regional plans, programs and policies except the South Coast AQMP. As discussed above, implementation of Alternative B would result in emissions of NO_X that exceed SCAQMD thresholds.

During construction of Alternative B, sensitive receptors could be exposed to significant NO_X emissions. NO_2 is a portion of NO_X emissions. NO_2 can irritate the nose throat, and lungs, especially in people with asthma. It also lowers resistance to respiratory infection. VOCs contribute to the formation of smog and/or may be toxic. Implementation of the mitigation measures presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant. Therefore, construction of Alternative B could result in short-term significant impacts to sensitive receptors near the Airport.

As discussed in Section 3.4, Hazards and Hazardous Materials, asbestos containing materials and lead-based paint could be induced into the environment during construction. Airport workers could, therefore, be exposed to asbestos and lead-based paint emissions during construction of the Alternative B. Implementation of the mitigation program presented in Section 3.4 would reduce these impacts to a level considered less than significant.

During construction of the Alternative B, airport workers could also be exposed to NO_X emissions generated by construction equipment. As previously discussed, NO_2 is a portion of NO_X emissions. NO_2 can irritate the nose throat, and lungs, especially in people with asthma. It also lowers resistance to respiratory infection.

These short-term exposures would not be expected to directly result in increased cancer risk because exposure to carcinogens is cumulative throughout a person's life. No impact would occur. No mitigation would be required.

Project Related Impacts

As with the Proposed Project, Alternative B would not result in any additional flights or passenger levels or change operational procedures. Therefore, implementation of Alternative A would not result in any air quality impacts beyond those related to construction activities. No mitigation measures would be required.

Additional Impacts Related to Optimized Flights

Operations under the Alternative B Optimized Flights scenario would result in the same impacts as operations under the Proposed Project Optimized Flights scenario. These impacts are summarized below.

As with the Proposed Project, incremental air quality emissions under the Alternative B Optimized Flights scenario would exceed SCAQMD's PM_{10} concentration threshold due to associated GSE and vehicular traffic activity, thereby contributing substantially to an existing air quality violation and exposing sensitive receptors to significant PM_{10} concentrations. The mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.

Operations under the Alternative B Optimized Flights scenario would also exceed SCAQMD's thresholds of significance for CO, VOC and NO_X. The mitigation program presented in Section 3.2.3 would reduce CO and VOC impacts to a level considered less than significant; however, NO_X emissions would remain significant.

Operations under the Alternative B Optimized Flights scenario would be consistent with all applicable local and regional plans, programs and policies except the South Coast AQMP. As with the Proposed Project, implementation of the Alternative B Optimized Flights scenario would result in emissions of PM_{10} that exceed SCAQMD thresholds.

Under the Alternative B Optimized Flights scenario, all estimated incremental cancer inhalation risks for residents, school children, and off-Airport workers would be less than the cancer risk significance threshold of 10 in one million under the Alternative B Optimized Flights scenario. Similarly, risks associated with exposure to TACs by pathways other than inhalation would not contribute significantly to total risk. No impacts would occur. No mitigation would be required.

Estimated 8-hour maximum concentrations for the 2011 Alternative B Optimized Flights scenario would be less than associated PEL-TWAs by two orders of magnitude or more. In addition, most, or all, on-Airport workers would either move around the Airport or be located in an area removed from the point of highest exposure. Even at locations where airport workers might be exposed to the highest concentrations, no exceedances of workplace standards would be expected. No impacts would occur. No mitigation would be required.

Alternative C (No Project)

<u>Construction Related Impacts</u>

Alternative C would not result in any construction-related impacts in that it does not propose any construction activities. No impacts would occur. No mitigation would be required.

<u>Project Related Impacts</u>

None of the terminal area improvements associated with the Proposed Project would be implemented under Alternative C. However, due to increasing regional air travel demand, flight levels at the Airport would be expected to rise within the limitations of the Noise Ordinance. As previously discussed, without the Proposed Project's parking structure and roadway improvements, PM_{10} levels in the vicinity of the Airport would be higher due to more trips and increased vehicle idling. Therefore, air quality emissions under Alternative C would exceed SCAQMD's PM_{10} concentration more significantly than the Proposed Project. The PM_{10} exceedance would contribute substantially to an existing air quality violation, and expose sensitive receptors to significant PM_{10} concentrations. Implementation of the mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.

<u>Additional Impacts Related to Optimized Flights</u>

Operations under the No Project Optimized Flights scenario would be essentially the same as operational impacts under the Proposed Project with Optimized Flights scenario. These impacts are summarized below.

As with the Proposed Project with Optimized Flights, incremental air quality emissions under the No Project Optimized Flights scenario would exceed SCAQMD's PM_{10} concentration threshold due to associated GSE and vehicular traffic activity, thereby contributing substantially to an existing air quality violation and exposing sensitive receptors to significant PM_{10} concentrations. The mitigation program presented in Section 3.2.3 would reduce these impacts, but not to a level considered less than significant.

Operations under the No Project Optimized Flights scenario would also exceed SCAQMD's thresholds of significance for CO, VOC and NO_X. The mitigation program presented in Section 3.2.3 would reduce CO and VOC impacts to a level considered less than significant; however, NO_X emissions would remain significant.

The maximum 1-hour concentration of acrolein under the No Project Optimized Flights scenario would exceed established RELs, thereby resulting in significant acute health impacts.

Operations under the No Project Optimized Flights scenario would not be consistent with the South Coast AQMP or the Los Angeles County Congestion Management Program. As with the Proposed Project with Optimized Flights, implementation of the No Project Optimized Flights scenario would result in emissions of PM_{10} that exceed SCAQMD thresholds. In addition, as discussed in Section 3.8, Traffic and Circulation, implementation of the No Project Optimized Flights scenario would result in impacts to roadways and intersections in the vicinity of the Airport.

Under the No Project Optimized Flights scenario, all estimated incremental cancer inhalation risks for residents, school children, and off-Airport workers would be less than the cancer risk significance threshold of 10 in one million under the No Project Optimized Flights scenario. Similarly, risks associated with exposure to TACs by pathways other than inhalation would not contribute significantly to total risk. No impacts would occur. No mitigation would be required.

Estimated 8-hour maximum concentrations for the 2011 No Project Optimized Flights scenario would be less than associated PEL-TWAs by two orders of magnitude or more. In addition, most, or all, on-Airport workers would either move around the Airport or be located in an area removed from the point of highest exposure. Even at locations where airport workers might be exposed to the highest concentrations, no exceedances of workplace standards would be expected. No impacts would occur. No mitigation would be required.

3.2.3 MITIGATION PROGRAM

<u>Project Design Features</u>

PDF 3.2-1 As part of project design, the City of Long Beach shall ensure the terminal area improvements are designed and constructed to meets LEED specifications.

Standard Conditions and Regulations

SC 3.2-1 During construction of the Proposed Project, the City and its contractors will be required to comply with regional rules, which would assist in reducing short-term air pollutant emissions. SCAQMD Rule 402 requires that air pollutant emissions should not create a nuisance off-site. SCAQMD Rule 403 requires that fugitive dust be controlled with the best available control measures so the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. Two options are presented in Rule 403; monitoring of particulate concentrations or active control. Monitoring involves a sampling network around the project with no additional control measures unless specified concentrations are exceeded. The active control option does not require any monitoring, but requires that a list of measures be implemented starting with the first day of construction.

Rule 403 requires that "A person conducting active operations within the boundaries of the South Coast Air Basin shall utilize one or more of the applicable best available control measures to minimize fugitive dust emissions from each fugitive dust source type which is part of the active operation." Rule 403 also requires that the construction activities "shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined by simultaneous sampling, as the difference between upwind and down wind sample." A project is exempt from the monitoring requirement "if the dust control actions, as specified in Table 2 are implemented on a routine basis for each applicable fugitive dust source type." Table 2 from Rule 403 is presented below as Table 3.2-21. Under high wind conditions (*i.e.*, when wind gusts exceed 25 miles per hour) additional control measures are required, and "the required control measures for high wind conditions are implemented for each applicable fugitive dust source type, as specified in Table 1." Table 1 from Rule 403 is presented below as Table 3.2-22. Monitoring of particulate concentrations does not reduce fugitive dust emissions; therefore, to minimize fugitive dust emissions the construction activities will utilize the measures presented in Table 3.2-22 and Table 3.2-21 (Tables 1 and 2 in Rule 403) rather than the monitoring option of SCAQMD Rule 403.

Further, Rule 403 requires that the project shall "prevent or remove within one hour the track-out of bulk material onto public paved roadways as a result of their operations." Alternatively, the project can "take at least one of the actions listed in Table 3." Table 3 from Rule 403 is presented below as Table 3.2-23. In addition, the project would be required to "prevent the track-out of bulk material onto public paved roadways as a result of their operations and remove such material at anytime track-out extends for a cumulative distance of greater than 50 feet on to any paved public road during active operations; and remove all visible roadway dust tracked-out upon public paved roadways as a result of active operations at the conclusion of each work day when active operations cease.

TABLE 3.2-22
FUGITIVE DUST CONTROL ACTIONS FOR EXEMPTION TO MONITORING
(RULE 403 TABLE 2)

Source Category	Control Actions
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the USEPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR (1a-1) For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas	(1b) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the USEPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the USEPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.
Earth-moving: Construction cut areas and mining operations	(1c) Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b) Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c) Apply chemical stabilizers within five working days of grading completion; OR (2d) Take actions (3a) or (3c) specified for inactive disturbed surface areas
Inactive disturbed surface areas	(3a) Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR (3b) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (3c) Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR (3d) Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.
Unpaved Roads	(4a) Water all roads used for any vehicular traffic at least once per every two hours of active operations; OR (4b) Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR•(4c) Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a) Apply chemical stabilizers; OR (5b) Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR (5c) Install temporary coverings; OR (5d) Install a three-sided enclosure with walls with no more than 50 percent porosity which extends, at a minimum, to the top of the pile.
All Categories	(6a) Any other control measures approved by the Executive Officer and the USEPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3.2-23
REQUIRED BEST AVAILABLE CONTROL MEASURES
(SCAQMD RULE 403, TABLE 1)

Control Measure	Guidance
Backfilling	
01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	• Mix backfill soil with water prior to moving • Dedicate water truck or high capacity hose to backfilling equipment • Empty loader bucket slowly so that no dust plumes are generated • Minimize drop height from loader bucket
Clearing and Grubbing	
02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	• Maintain live perennial vegetation where possible • Apply water in sufficient quantity to prevent generation of dust plumes
Clearing Forms	
03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	• Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	
04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	• Follow permit conditions for crushing equipment • Pre-water material prior to loading into crusher • Monitor crusher emissions opacity • Apply water to crushed material to prevent dust plumes
Cut and Fill	
05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	• For large sites, pre-water with sprinklers or water trucks and allow time for penetration • Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – Mechanical/Manual	
06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	• Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed Soil	
07-1 Stabilize disturbed soil throughout the construction site; and 07-02 Stabilize disturbed soil between structures	• Limit vehicular traffic and disturbances on soils where possible • If interior block walls are planned, install as early as possible • Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 3.2-23 (Continued)
REQUIRED BEST AVAILABLE CONTROL MEASURES
(SCAQMD RULE 403, TABLE 1)

Control Measure	Guidance
Earth-Moving Activities	
08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	• Grade each project phase separately, timed to coincide with construction phase • Upwind fencing can prevent material movement on site • Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Importing/Exporting of Bulk Materials	
09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	• Use tarps or other suitable enclosures on haul trucks • Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage • Comply with track-out prevention/mitigation requirements • Provide water while loading and unloading to reduce visible dust plumes
Landscaping	
10-1 Stabilize soils, materials, slopes	• Apply water to materials to stabilize, maintain materials in a crusted condition • Maintain effective cover over materials • Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes • Hydroseed prior to rain season
Road Shoulder Maintenance	
11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	• Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs • Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs
Screening	
12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	• Dedicate water truck or high capacity hose to screening operation • Drop material through the screen slowly and minimize drop height • Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging Areas	
13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	• Limit size of staging area • Limit vehicle speeds to 15 miles per hour • Limit number and size of staging area entrances/exists

TABLE 3.2-23 (Continued)
REQUIRED BEST AVAILABLE CONTROL MEASURES
(SCAQMD RULE 403, TABLE 1)

Control Measure	Guidance
Stockpiles/Bulk Material Handling	
14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	• Add or remove material from the downwind portion of the storage pile • Maintain storage piles to avoid steep sides or faces
Traffic Areas for Construction Activities	
15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	• Apply gravel/paving to all haul routes as soon as possible to all future roadway areas • Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	
16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16.2 Stabilize soils at the completion of trenching activities.	• Pre-watering of soils prior to trenching is an effective preventive measure. • For deep trenching activities, pre-trench to 18 inches, soak soils via the pre-trench and resume trenching • Washing mud and soils from equipment at the conclusion of trenching activities to prevent crusting and drying of soil on equipment
Truck Loading	
17-1 Pre-water material prior to loading; and 17.2 Ensure that freeboard exceeds six inches (CVC 23114)	• Empty loader bucket such that no visible dust plumes are created • Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	
18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	• Haul waste material immediately off-site
Unpaved Roads/Parking Lots	
19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	• Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant Land	
20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

TABLE 3.2-24
TRACK OUT CONTROL OPTIONS

(1)	Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet.
(2)	Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track-out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track-out control device.
(3)	Any other control measures approved by the Executive Officer and the USEPA as equivalent to the methods specified in Table 3 may be used.

SC 3.2-2 In support of PDF 3.2-1, requiring the design and construction of the terminal improvements to meet LEED standards, building materials, architectural coatings and cleaning solvents shall comply with all applicable SCAQMD rules and regulations.

SC 3.2-3 In support of PDF 3.2-1, requiring the design and construction of the terminal improvements to meet LEED standards, all new and substantially modified buildings shall meet California Title 24 Energy Efficiency standards for water heating, space heating and cooling, to the extent feasible.

SC 3.2-4 All new and modified point source facilities (e.g., utility equipment, fuel storage and dispensing) shall obtain all required permits from the SCAQMD. To obtain these permits, the facilities will need to include Best Available Control Technology (BACT) that reduces emissions of criteria pollutants.

SC 3.2-5 In support of PDF 3.2-1 and to conserve energy, require that all exterior lighting use color-corrected low sodium lighting.

Mitigation Measures

The following mitigation measures are recommended to reduce construction-related impacts associated with the Proposed Project and project alternatives:

MM 3.2-1 The contract specifications shall require and the City shall enforce general contractors to ensure that all equipment is properly tuned and maintained in accordance with manufacturers' specifications.

MM 3.2-2 The contract specifications shall require and the City shall enforce general contractors to maintain and operate construction equipment so as to minimize exhaust emissions. During construction, engines on trucks and vehicles in loading and unloading queues will be turned off when not in use, to reduce vehicle emissions. Construction activities should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.

MM 3.2-3 The contract specifications shall require and the City shall enforce general contractors sweep streets as needed during construction, but not more frequently than hourly, if visible soil material has been carried onto adjacent public roads.

MM 3.2-4 The contract specifications shall require and the City shall enforce general contractors to visually inspect construction equipment prior to leaving the site; loose dirt shall be washed off with wheel washers as necessary.

MM 3.2-5 During construction, the City shall coordinate with the contractor to maximize the ability to power construction activity utilizing electricity from power poles rather than temporary diesel or gasoline power generators, to the extent possible.

MM 3.2-6 The contract specifications shall require that all on-site mobile equipment used during construction shall be powered by alternative fuel sources (i.e., methanol, natural gas, propane, or butane) where feasible.

MM 3.2-7 During construction, the City shall provide a location and require the contractor to store all construction equipment used in the project construction within the project site (away from adjacent residential areas) to reduce the impact on the roadway system and the resultant air emissions.

On-site construction equipment staging areas and construction worker parking lots shall be located on either paved surfaces or unpaved surfaces that are periodically treated with non-toxic soil stabilizers.

MM 3.2-8 The contract specifications shall require and the City shall enforce the contractor to schedule all deliveries related to construction activities that affect traffic flow during off-peak hours (e.g., 10:00 a.m. and 3:00 p.m.) and deliveries shall be coordinated to achieve consolidated truck trips. When traffic flow is impacted by the movement of construction materials and/or equipment, temporary traffic controls shall be provided to improve traffic flow (e.g., flag person).

MM 3.2-9 The contract specifications shall require all on-site heavy-duty construction equipment shall be equipped with diesel particulate traps to the extent that this equipment is available at the time the contracts are awarded.

MM 3.2-10 The construction specifications shall require and the City shall enforce that emulsified diesel fuel be used in diesel-fueled construction equipment that is not equipped with diesel particulate traps to reduce NO_X emissions.

The use of emulsified diesel fuel in construction equipment is assumed to reduce construction equipment NO_X emissions by 15 to 20 percent (CARB 2004). Applying the lower end of that range to the peak daily NO_X emissions from construction equipment would reduce NO_X emissions by approximately 70 lbs/day to a peak day NO_X emission inventory for construction of 424 lbs/day. This level would still be above the significance threshold. VOC emissions would also remain significant and unavoidable.

The Proposed Project is a construction activity and, as such, would not result in operational impacts. The following mitigation options are proposed to reduce operational emission impacts associated with the Optimized Flights scenario and project alternatives:

MM 3.2-11 During project design, the architect shall provide that all fixtures used for lighting exterior common areas are regulated by automatic devices to turn off lights when they are not needed.

MM 3.2-12 As part of the air carrier ramp design, the City of Long Beach shall incorporate electric charging stations infrastructure to support operation of electric GSE and other on-airport vehicles.

MM 3.2-13 As part of the air carrier ramp design, preconditioned air and 400 Hz power from electric units (or electric power grid) will incorporate provisions at the commercial passenger aircraft parking positions to allow aircraft pilots the ability to plug in at the gate and turn off the APU.

MM 3.2-14 The City shall require the use of ultra-low sulfur diesel for diesel-fueled equipment that are not readily convertible to electrical power on all future lease and operational agreements for air carriers.

MM 3.2-15 Through its lease language with them, the City of Long Beach shall require the airlines to comply with the South Coast GSE MOU signed by the airlines and CARB in December 2002, or replacement agreements and/or regulations. Through the implementation of MM 3.2-12 and MM 3.2-13 the Airport will design the infrastructure necessary to assist airlines in complying with the GSE MOU. The GSE MOU includes provisions for retrofitting diesel GSE with particulate traps where feasible. Therefore, compliance with the GSE MOU would reduce PM_{10} and $PM_{2.5}$ impacts as well as NO_X and VOC emissions.

The mitigated criteria pollutant emission inventories associated with installing preconditioned air, 400 Hz power, and electric battery chargers would reduce APU CO emissions by 61 and APU NO_X emissions by 57 percent in 2011 and 2020. GSE CO emissions would be reduced by 97 percent in 2011; and GSE NO_X emissions would be reduced by 55 percent in 2011 and 40 percent in 2020.

Comparing the mitigated Project criteria pollutant incremental inventories to the operational emission thresholds indicates that the mitigated inventories of all pollutants except NO_X will be below the significance thresholds in 2011 and 2020.

3.2.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the measures included in the mitigation program would reduce air quality impacts to the greatest extent feasible, but not to a level considered less than significant. Even with the proposed mitigation measures, construction of the Proposed Project, as well as Alternatives A and B, would result in significant, temporary, unavoidable NO_X and VOC impacts.

Operations under the Optimized Flights scenario would exceed SCAQMD's PM_{10} concentration threshold and exceed SCAQMD's thresholds of significance for CO, VOC, and NO_X. The mitigation program presented in Section 3.2.3 would reduce CO and VOC impacts to a level considered less than significant; however, PM_{10} and NO_X emissions would remain significant.

Because the Optimized Flights scenario analyzes air quality impacts associated with airport operations and associated GSE and vehicular traffic activities, these impacts would be expected to occur whether or not the Proposed Project is implemented. As noted above, PM_{10} impacts would be worse without the roadway improvements that would be implemented in conjunction with the Proposed Project.